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MEDICAL SOCIETY
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BLANE, SIR G.

OBSERVATIONS

ON THE

DISEASES

OF

SEAMEN,

BY

GILBERT BLANE, M.D.

F.R.S.S. LOND. AND EDIN.

PHYSICIAN EXTRAORDINARY TO THE PRINCE AND PRINCESS OF WALES,

PHYSICIAN TO THE DUKE OF CLARENCE,

AND ONE OF THE COMMISSIONERS OF SICK AND WOUNDED SEAMEN.

THE THIRD EDITION,

WITH CORRECTIONS AND ADDITIONS.

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1800.

Nec Medici, nec Imperatores, nec Oratores, quamvis artis præcepta perceperint, quidquam magna laude dignum ſine uſu et excercitatione conſequi poſſunt.

CICERO.

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TO

HIS ROYAL HIGHNESS

THE DUKE OF CLARENCE

AND ST. ANDREW'S;

ADMIRAL, &c. &c. &c.

SIR,

THE following Work is the fruit of ſeveral years labour employed in the Public Service, chiefly under that great and ſucceſsful Admiral, Lord Rodney, in a ſeries of Naval Operations, which have been productive of events more glorious than any before recorded in the Annals of Britain. As your Royal Highneſs was preſent dur-

ing ſome part of the ſervice which is the ſubject of theſe Obſervations, and as You have not only honoured the Sea Service by embracing it as a profeſſion, and enrolling your illuſtrious Name among its officers, but in undergoing the dangers and fatigues of actual ſervice, which is ſo neceſſary to attain that practical Skill which Your Royal Highneſs is well known to poſſeſs, I preſume, upon theſe grounds, humbly to requeſt Your countenance to this Work. I ſhould do this with greater ſatisfaction, were it more worthy of Your patronage; but however inadequate my abilities may have been to the taſk, it has been my ſincere aim to produce a work of ſome utility to that only Bulwark of our Country, the Britiſh Navy, of which your Royal Highneſs is the Pride and the Hope.

This

This Work is alſo inſcribed to Your Royal Highneſs with the greater propriety, that it is not intended merely for thoſe of the medical profeſſion, but calculated for the uſe of commanders, upon whom chiefly the prevention of ſickneſs depends; and Your Royal Highneſs has been pleaſed to inculcate by Your example, that this part of the naval ſervice, as it is highly intereſting in point of humanity as well as policy, ſo is it an object of indiſpenſable duty in commanding officers, and not unbecoming the dignity of the moſt exalted rank.

Your Royal Highneſs's Permiſſion to inſcribe this work to You, and the perſonal Notice and Protection with which You have been pleaſed to honour me, I conſider as the firſt Diſtinctions of my life, and of which I

hope ever to entertain a becoming ſenſe, by cheriſhing thoſe indelible ſentiments of Reſpect, Gratitude, and Attachment, which are due to Your Royal Highneſs from

Your Royal Highneſs's

Moſt faithful,

Moſt obedient, and

Moſt devoted Servant,

GILBERT BLANE.

PREFACE.

HAVING been appointed Phyſician to the Fleet under the command of Lord RODNEY, in the beginning of the year 1780, I determined to avail myſelf, to the utmoſt of my abilities, of the advantages which this field of obſervation afforded. This I was led to do, in order to ſatisfy my own mind as a matter of duty, as well as to find out, if poſſible, the means of bettering the condition of a claſs of Men, who are the great Safeguard of the State, but whoſe lot is hardſhip and diſeaſe, above that of all others.

A Fleet, conſiſting ſeldom of leſs than twenty ſhips of the line of battle, and ſometimes exceeding forty, which I attended in the different ſcenes of active ſervice in that diſtant and unhealthy region, for more than three years, has afforded me opportunities of making obſervations upon a large ſcale.

My object has been prevention as much as cure; and as the former muſt more particu-

larly depend on a knowledge of the external cauſes of diſeaſe, I have collected and arranged all the facts upon this ſubject that came within my reach, conſidering theſe as the only grounds from whence the remote cauſes of health and ſickneſs could be deduced.

When I entered upon my employment, the Commander in Chief gave an order, that every ſurgeon in the fleet ſhould ſend me a monthly return, ſtating the degree of prevalence of different diſeaſes, the mortality, and whatever elſe related to the health of the reſpective ſhips. This was done with a view to enable me to regulate the reception of men into hoſpitals, ſo that each ſhip might have a due proportion of relief, according to the degree of ſickneſs on board, taking care at the ſame time that the hoſpitals ſhould not be overcrowded; and alſo to acquaint the Commander in Chief, from time to time, of the ſtate of ſickneſs, or the predominance of particular diſeaſes, in order to recommend ſuch articles of diet, or other means, as might tend to cure them, or to check their progreſs. Theſe returns have ſerved alſo in this work as a method of collecting a multitude of well-eſtabliſhed facts, tending to aſcertain the cauſes and courſe of diſeaſe.

I feel

I feel greatly indebted to the ſurgeons for the punctuality and exactneſs with which they furniſhed theſe returns, and I ought not to ſuffer any opportunity to eſcape of expreſſing my value for this claſs of officers. They are perhaps more regarded in our ſervice than in that of other nations, but it would be for the public benefit if they were ſtill more reſpected and encouraged. To men of liberal education and ſentiments, as ſurgeons ought to be and generally are, the moſt effectual inducements for them to enter into the ſervice, and to do their duty when there, are flattering attentions, and a certain degree of eſtimation in the eyes of other officers. This in its operation on liberal minds would, to a certain length, ſtand in place of pecuniary emolument. It is what may be called, in the words of a late eloquent writer *, "The cheap defence of nations." Liberality of manners on the part of ſuperiors, is at the ſame time a more likely means of enſuring a conſcientious performance of duty in this profeſſion, than ſtrict and diſtant behaviour, which may indeed operate on the minds of thoſe whoſe functions are merely mechanical, but how can it inſuſe that tender attention to human ſufferings, and that ſenſe of duty which may induce a man, entruſted

* Mr. Burke's Reflections on the French Revolution.

with

with the health and lives of his fellow-creatures, to act his part with propriety and effect?

While the fleet was in port, I alſo ſuperintended and viſited daily the hoſpitals, of which there is one at almoſt every iſland on the ſtation; and having kept an account of the different kinds of diſeaſe that were admitted, and of their mortality, I have in this way likewiſe been furniſhed with a number of facts that may throw light on the hiſtory of human maladies, and lead to their prevention and cure.

It behoves every one who engages in a profeſſion ſo important, and at the ſame time ſo full of ambiguity as that of medicine, to diſcipline his mind properly with regard to the laws of evidence, and the rules of inveſtigation, ſo as to draw fair inferences from facts, to avoid credulity on the one hand, and ſceptiſcim on the other, both of which are equally unfriendly to the diſcovery and application of practical truths. It will not therefore be out of place here to ſubmit to the reader the principles which have guided me on this ſubject.

Practical ſkill in every art conſiſts, I apprehend, in adapting means to ends, and muſt therefore be founded on the knowledge of the energies

energies of natural agents as they reciprocally affect each other, and it is the buſineſs of obſervation and experience to aſcertain and ſelect the facts conſtituting this knowledge*.

In thoſe enquiries which have inanimate matter for their ſubject, a ſingle fact may be a ſufficient ground for an obſervation, but in thoſe which relate to the living body, there are ſeveral circumſtances which give occaſion to ambiguity, and render the diſcovery of practical truths more difficult.

The firſt I ſhall mention is, that there are reſources in nature whereby diſeaſes are ſubdued without any interpoſition of art, as is evident with regard to wounds, and even acute diſeaſes, not only in animals but in the human ſpecies, and that therefore the operations of nature and of art come to be ſo blended, that it is difficult to diſtinguiſh them ſo as to aſcertain what is due to each. It is well obſerved by ſome medical writer, that the animal frame differs from all other machines in this, that when out of order it can rectify itſelf. This holds with regard to prevention as well as cure; for infection, not excepting that of

* See this farther elucidated at page 39 of a Lecture on Muſcular Motion, read before the Royal Society of London the 13th and 20th of Nov. 1788, by Gilbert Blane, M. D.

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the plague, will frequently diſappear ſponta-neouſly. It is not meant by this to detract from the efficacy or utility of the art of phyſic; for allowing it to be true in its full exent, it ſtill becomes a queſtion, in the eye of reaſon, how to regulate nature, with regard to her external agents, ſuch as heat, cold, and diet; and it becomes the buſineſs of art to interpret her intentions with regard to them. And when we reflect that the diſeaſes and caſual-ties of the human ſpecies are multiplied and aggravated by the artificial modes of life de-pendent on our reaſon, it is preſumable that theſe muſt be oppoſed by artificial means of relief ſuggeſted alſo by reaſon. But it is not merely preſumable but certain, as a matter of fact, that moſt diſeaſes are more or leſs under the controul of art; and one could be named which, being abſolutely irreſiſtable by the powers of nature, would go far towards the extinction of our ſpecies, were it not reſiſtable by the powers of medicine.

The next peculiar ſource of difficulty al-luded to, conſiſts in the diverſity of the con-ſtitution of individuals, depending on natural *ſtamina*, and other circumſtances, ſuch as age, ſex, and habits of life, in conſequence of which it becomes neceſſary to vary practice in the ſame diſeaſe by a nice exerciſe of diſcri-minative

minative judgment, and to be cautious in drawing general concluſions from ſingle facts.

The third circumſtance of this kind which I ſhall mention is, that the living human body, while it is acted upon by all the cauſes which affect inanimate matter, is alſo ſubject not only to thoſe affections which are incident to animal nature in general, but to thoſe depending on the operations and paſſions of the mind connected with rationality. It is evident, that where a cauſe is ſimple there is little difficulty in aſcertaining it, and applying it to a practical purpoſe; but when an effect is the reſult of many cauſes, as is here the caſe, it becomes impoſſible to embrace and calculate them all, ſo as either to predict or command any event depending on their joint action, without the utmoſt riſque of error; and this is ſo much the caſe with regard to diſeaſes, that it ſeems moſt adviſeable to lay aſide, in a great meaſure, the conſideration of internal and latent cauſes derived from refined ſpeculations, and to be guided in practice by a few obvious principles, and by the ſenſible effects, produced by external agents whoſe powers are aſcertained by obſervation and experience.

Fourthly, The great obſcurity of the cauſes of moſt diſeaſes, and the difficulty of inveſtigating

ing the principles of the animal œconomy. It may be ſafely affirmed, that theſe are ſtill ſo imperfectly known, as to admit of little practical application. The theoretical doctrines of phyſic have generally no better foundation than hypotheſis, and have taken their colour from the prevailing philoſophy of the times. The principles of mechanics, hydraulics, and chemiſtry, have at different periods been ſo plauſibly applied to explain the functions of life, and the operations of medicines, as to gain the general aſſent of the times. Though juſter views of the animal œconomy have cauſed theſe pretty univerſally to be exploded in this age, yet the experience of paſt errors has not prevented our contemporaries from yielding to the faſcinating novelty of a new branch of philoſophy, called the pneumatic chemiſtry. This has been ſo ſucceſsfully cultivated of late, as to do honour to the preſent age, by its important diſcoveries in the habitudes of ſeveral ſpecies of inanimate matter. Nor can it be denied, that it has been ingeniouſly applied to explain ſome of the *phænomena* of life; but this muſt neceſſarily be partial and limited, in as much as life is regulated by laws of its own, and in ſo far as relates to practical inferences, the application of the new chemiſtry ſeems equally fanciful, puerile, and fallacious, as that of the mechanical and chemical principles of the older ſchools.

Theoretical enquiries into animal nature, have in our times indeed been conducted by ſome authors upon principles of greater philoſophical preciſion, by conſidering it as ſubject to laws peculiar to itſelf. But it yet remains to be proved, what ſubſtantial practical advantage has reſulted from theſe ſpeculations.

The reaſon why phyſiology has not been applied with more ſucceſs to practice, is not only becauſe the greater part of the reaſonings are hypothetical, and therefore uncertain and fallacious, but becauſe it is neceſſary for this end, that this ſort of knowledge ſhould be perfect in every branch of the animal œconomy. It is not enough that we can aſcertain one or more points, for there are ſo many bearings, and mutual dependencies in the functions of the human frame, that if we are to act upon our knowledge of them *a priori*, a perfect knowledge of them all is neceſſary, with a view to any efficient practical purpoſe, as they may all have more or leſs ſhare in any given effect intended to be produced. To neglect the conſideration of any one of them, in the meaſures to be adopted, would prove a ſource of error, ſimilar to the omiſſion of one of the elements in a calculation, and would in like manner

manner produce an erroneous reſult. The circulation of the blood, which is one of the few diſcoveries in the animal œconomy, that has been incontrovertibly eſtabliſhed, has not been of ſo much practical utility as might be ſuppoſed; the reaſon of which is evident from the foregoing conſiderations; for it is not the mere mechaniſm of our frame that determines its operations, but alſo the energies depending on ſenſibility, irritability, and the affections and operations of the mind.

If theory could be rendered perfect, there can be no doubt of its utility, in as much as our knowledge of nature extends our power over nature. But it is highly improbable that in a ſyſtem ſo dark and complicated as the living human frame, it will ever arrive at this perfection, and from its preſent crude ſtate, and from the eagerneſs of the human mind to pry into cauſes, and to make a haſty application of ſcience to practice, what is called phyſiology and pathology are extremely liable to abuſe, and this abuſe has been one of the principal means of corrupting practical medicine and retarding its progreſs. It is but fair however to acknowlege that ſtudies of this kind have their uſe, for in common with natural knowledge in general they ſerve to enlighten the mind by baniſhing ſuperſti-

tion

tion and credulity; and though practical truths can rarely be deduced from them, yet theory, even though falſe, tends to ſuggeſt new remedies and methods of cure, and to confirm or vary thoſe which are already in uſe; in this way miniſtering to experience, without the ſanction of which theſe ſuggeſtions are deſerving of no regard *. It is remarkable that Boerhaave, upon fanciful principles, diſcovered ſeveral uſeful facts.

As we have ſo little to expect, therefore, from theory, and as it has appeared that animal life is influenced by ſo many circumſtances affecting the reſult of experiments, and giving riſe to contingent events, a great number of facts, duly varied and compared, muſt be neceſſary, in order to produce thoſe legitimate deductions properly conſtituting *obſervations*. An obſervation is, as it were, a general fact, deduced from the average of a number of individual facts, and in the art of phyſic moſt obſervations are the reſults of in-

* See this queſtion treated fully and accurately, and in the moſt impartial and diſpaſſionate manner, by Cornelius Celſus (an Author who lived in the time of Tiberius Cæſar) in his Preface, a compoſition which can never be enough admired for its good ſenſe as well as elegance.

ductions more elaborate and difficult than perhaps in any other branch of art or ſcience. In order to attain them, there is required not only patient attention to collect, and memory to retain, but that rapid intuitive glance of the mind called ſagacity, to compare and diſcriminate them in the moment of application. This faculty is a ſort of higher inſtinct, inſtituting an inſtantaneous and tacit calculation; and it is by attempting an imitation of this proceſs of the mind, that I have endeavoured to frame the method of inveſtigation purſued in this work.

The laſt impediment I ſhall mention, to the progreſs of medical truth, is the great difficulty of appreciating teſtimony. We have not only to guard againſt our own credulity and ſelf-deception, but thoſe of others. In conſequence of medical practitioners not accurately diſtinguiſhing between the operations of nature and of art, drawing inferences from individual caſes, and being biaſſed by favourite theories, not to mention the allurements of vanity and ſelf-intereſt, which it is to be hoped ſeldom influence the regular members of the profeſſion, it is a melancholy truth, that there is perhaps no branch of human knowledge in which there is ſo great a want

a want of correctneſs with regard to recorded facts.

The whole ſubject of medical inveſtigation and evidence, being of the utmoſt conſequence, would require a more full diſcuſſion; but it has here already exceeded the uſual bounds of a preliminary diſcourſe. Enough, however, has been ſaid to convince every perſon of a correct judgment, how difficult it is to aſcertain truths, and to draw fair and ſolid inferences, on medical ſubjects.

I have attempted, in the following work, little more than to amaſs, from my own obſervation, and by the aſſiſtance of the ſurgeons of the fleet, a number of well-eſtabliſhed facts, and to arrange them in ſuch a methodical manner, as to prove a groundwork for inveſtigation; and I am perſuaded that others may be able to deduce from them obſervations that may have eſcaped me, eſpecially if theſe new, but imperfect, attempts, ſhould come to be compared with ſimilar ones that may be made by other obſervers in other climates, and in other circumſtances of ſervice.

It is evident, from the conſiderations that have been ſtated, that it is of the utmoſt con-

ſequence to be poſſeſſed of an accurate hiſtory of diſeaſes. 1ſt. It is by this only that they can be duly diſcriminated. 2dly. It aſſiſts in teaching us what the powers of unaſſiſted nature are equal to, ſo as to aſcertain what is expected from art, and what is imputable to it. 3dly. It gives us an inſight into their nature, prevention, and cure, by acquainting us with the influence of the *juvantia* and *lædentia*, to which thoſe who are the ſubjects of diſeaſe are either neceſſarily or caſually expoſed.

I met with ſeveral obſtacles in inſtituting enquiries, purely medical, to the extent I could have wiſhed. There are, in the firſt place, from the nature of the ſubject, as has been already explained, certain difficulties attending all practical enquiries in medicine. But, beſides this difficulty belonging to the nature of the ſubject, there were others connected with the actual ſtate of the ſervice; for the hoſpitals were at times ſo inadequate in point of ſize, and ſo ill provided with neceſſary articles and accommodations, particularly during the firſt part of my attendance, that my principal care was to remedy theſe defects by proper ſuperintendance and repreſentation.

A due attention to air, diet, and cleanli-

neſs,

neſs, is not only more eſſential than mere medical treatment, but the ſick cannot be conſidered as fit ſubjects for evincing the powers of medicine till they are properly provided for in theſe reſpects. Theſe inconveniences were owing, in a great meaſure, to the unuſual extent of the ſervice; for there was a much greater naval force in thoſe ſeas at this period than was ever before known, and there was of courſe a proportional want of accommodation for the ſick. Towards the end of the war theſe difficulties were much obviated, ſo that a fairer field of obſervation preſented itſelf.

Another obſtacle to my practical enquiries was, that the fleets I belonged to ſeldom remained more than ſix weeks or two months at any one place, ſo that any ſeries of obſervations that might have been inſtituted was interrupted, and I was in a great degree deprived of the fruits of them, by not ſeeing the event of caſes under my management.

The peace in the ſpring of the year 1783 put an end to all my enquiries, and particularly prevented me from following out ſome practical reſearches. I have ventured, however, in one part of this work, to give the

reſult of my experience in ſome diſeaſes, more eſpecially ſuch as are peculiar to the climate and mode of life.

Upon the whole, I have, in the following work, humbly attempted to follow what I conceive to be the only true method of cultivating practical medicine, that is, to collect and compare a great number of facts. A few individual caſes are not to be relied on as a foundation of general reaſoning, the deductions from them being inconcluſive and fallacious, and they are liable to be turned and gloſſed, according as the mind of the obſerver may be biaſſed by a favourite prepoſſeſſion or hypotheſis. It has been my ſtudy to exhibit a rigid tranſcript of truth and nature upon a large ſcale, and to take the average of numberleſs particular facts, to ſerve as a ground work for obſervation; and I have endeavoured to analyſe and collate theſe facts, by throwing the monthly returns that were made to me into the form of tables, as the moſt certain and compendious way for finding their general reſult.

With regard to practical ſubjects, I have endeavoured to found my inferences entirely upon experience; and wherever theoretical views

views of the ſubject ſeem to have thrown any uſeful light, I have put it in the form of notes.

The firſt edition of this work appeared in 1785. It was reprinted in 1790, and having been for ſome time out of print, I feel it incumbent on me, from every principle of duty, to bring forward the preſent edition, with all the improvement in my power to beſtow upon it. Since the firſt materials for it were collected, ſixteen years ago, I have been twelve years phyſician to St. Thomas's hoſpital; and ever ſince my reſignation of that office in 1795, I have been one of the commiſſioners of ſick and wounded ſeamen, during which time this country has been at war with all the great maritime powers of Europe*. Theſe opportunities,

* Some idea may be formed of the magnitude of our marine at this time, from conſidering that the number of ſeamen and marines, voted laſt ſeſſion of Parliament, is a hundred and twenty thouſand; and I am aſſured, from the beſt authority, that the number actually employed ſomewhat exceeds this. The ſubjoined ſtatement, extracted from a monthly publication, will ſerve alſo to ſhow upon what ſcale the ſervice is at this moment; and whoever reflects on the preſent extent of our naval eſtabliſhments, the late unrivalled atchievements of our fleets, and the immenſe conſequence of them at this criſis, not only to theſe kingdoms, but to all Europe, will be ſufficiently diſpoſed to admit

tunities, as well as my private practice, have enabled me to make ſome improvements and additions to this work, which I hope will not be thought unimportant. Beſides reviewing and correcting the ſubjects formerly treated of,

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the importance of preſerving the lives and health of our ſeamen.

1ſt June, 1799.

Monthly ſtatement of the diſtribution of the Britiſh naval force, excluſive of the hired armed veſſels, which are chiefly employed in protecting the coaſting trade of Great Britain.

	Line.	50's.	Frg.	Sps.	Tot.
In port and fitting	7	2	48	127	184
Guard-ſhips, hoſpital-ſhips, and priſon-ſhips, at the ſeveral ports	36	3	3	0	42
In the Engliſh and Iriſh channels	28	2	34	51	115
In the Downs and North ſeas	12	4	12	33	61
At the Weſt India iſlands, and on the paſſage	5	0	22	25	52
At Jamaica	6	1	16	14	37
In America and at Newfoundland	2	1	9	9	21
Eaſt Indies, and on the paſſage	8	5	13	14	40
Coaſt of Africa	0	0	1	1	2
Gibraltar and Mediterranean	43	1	29	21	94
Total in commiſſion	147	19	187	295	648
Receiving ſhips	9	1	5	0	15
Serviceable and repairing for ſervice	4	0	5	0	9
In ordinary	20	2	34	34	90
Building	15	2	8	2	27
Total	195	24	239	331	789

of, I have added two new articles. One of theſe is a chapter on ulcers. In the former editions of this work I gave it as my opinion, that they were frequently contagious. I have now undertaken to prove it, and have alſo endeavoured to lay down the lateſt and moſt approved plans of treatment. This complaint has at all times been a moſt ſerious and afflicting evil in the ſea ſervice; but has prevailed to ſo uncommon a degree on ſeveral ſtations during this war, that though I had never been converſant in their treatment myſelf, I felt it my duty to communicate what I had met with in ſurgeons journals and reports, as well as books and converſation. The other new article is the chapter on caſualties.

The attention of the Board to which I belong, has alſo been more confined to medical objects, in conſequence of the care of priſoners of war in health having been transferred to the tranſport board at the time of my appointment, and the examination and appointment of ſurgeons and ſurgeons mates of the navy having been at the ſame period veſted in the medical board.

It has therefore been my ſtudy to contribute all in my power to the improvement of the medical ſervice of the navy, by aſſiſting

in

in framing and introducing new regulations and inſtructions; and I ſhould be wanting in truth and juſtice, if I did not here acknowledge the zealous and effectual co-operation which I have met with from my colleague, Dr. James Johnſton, whoſe great knowledge of the ſervice can only be equalled by his active and unremitting exertions in advancing its intereſts. We muſt leave it to others to ſay, how far the preſent unexampled ſtate of health of the navy is owing to our labours.

The method I propoſe to follow in this work is, firſt, to deliver the hiſtory of the different voyages and expeditions, ſo far as relates to health, giving an account of the prevalence and nature of the diſeaſes and mortality on board of ſhips and in hoſpitals.

Secondly, To deduce, from obſervations founded on theſe facts, and alſo from the former experience of others, the cauſes of ſickneſs in fleets, and the means of prevention.

Thirdly, To deliver ſome practical obſervations on the cure of the moſt common diſeaſes and caſualties incident to a ſea life.

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ERRATA.

Page 3, line 14. Inſert after *them*, "but it ought to be obſerved that the Montague was built of winter-felled timber."

P. 65. In the marginal reference for *I* read *L*.

P. 178. In the laſt line for 100,000, &c. read 110,000, but only 104,900 were actually employed. The greateſt number voted in the preceding war was 88,000.

P. 214 l. 15. After *dog* inſert "and the cow-pox."

P. 307. For Sect. III. read Chap. III.

P. 314. For Chap. III. and Chap. IV. corrections correſponding with the two laſt, to be made in the Table of Contents.

P. 416, l. 2. For *beat* read *part*.

P. 430, l. 20. Before *merit* inſert *it*.

P. 479, l. 9. For *deſcription* read *deſcriptive*.

P. 510, l. 6 and 7. For *ſo that* read *for*.

P. 526, l. 8. For *cupprum* read *cuprum*.

P. 530, l. 5. For *ſlava* read *ſlava*.

P. 586, l. 2. from the bottom of the page, for *regulum* read *regulam*.

P. 590, l. 5. from the bottom, inſert *non* before *omnino*.

P. 622, In the laſt two lines of the page, the following words ſhould have ſtood as a marginal note; "It ſhould have been added, *the putting the infected clothes into a heated oven.*"

OBSERVATIONS &c.

PART I.

BOOK I.

Comprehending the MEDICAL HISTORY of the FLEET, from March 1780, till Auguſt 1781.

CHAP. I.

DURING the war, which broke out with France in 1778, and with Spain in 1779, the Weſt Indies was the principal ſeat of naval operations, and much greater fleets were then employed in that quarter of the world than in any former period.

Though there had been a great ſquadron on the Caribbee ſtation during the greater part of 1779, no phyſician was appointed to it till the beginning of the next year, when I arrived there in that character with my friend and patron, Lord Rodney.

There were then ſixteen ſhips of the line on that ſtation, moſt of which had been

upwards of twelve months in the climate; and they were reinforced at this time by five more from England.

The ſquadron which we found on the ſtation was then extremely healthy, and in ſeveral of the ſhips there was not a man unfit for duty. We were told, however, that they had all been ſubject to ſickneſs, particularly to the dyſentery, ſoon after their arrival in that climate. Of the five with which the fleet was at this time reinforced, all but the Intrepid left England at Chriſtmas, making part of the ſquadron which effected the firſt relief of Gibraltar, under the command of Lord Rodney, who continued his route to the Weſt Indies, in order to take the command on the Windward ſtation, where he arrived on the 16th of March. The Intrepid had arrived with a convoy the day before. Theſe five ſhips were all pretty healthy on their paſſage, except the Sandwich and Terrible, in which a fever prevailed; but they had almoſt recovered from it before they arrived in the Weſt Indies. A dyſentery broke out in April in all the ſhips newly arrived, and it prevailed to the greateſt degree in thoſe

 which

which had been moſt affected with fevers in Europe, namely, in the Terrible and Intrepid. The Sandwich and Ajax were alſo affected, though in a leſs degree; but the Montagu, though this was her firſt voyage, and though ſhe was juſt off the ſtocks, had been the moſt healthy of any of them from the time of leaving England, and continued ſo during all this campaign. I have not obſerved that new ſhips are more unhealthy than others, unleſs they are built of ill-ſeaſoned timber; and they have this advantage, that there is no previous infection adhering to them. What may have contributed alſo to the ſuperior health of the Montagu, was the precaution that was taken when this ſhip was firſt manned and fitted out, of ſtripping and waſhing the men that were brought from the guardſhip to complete the crew.

The Intrepid, while in England, had been afflicted with fevers to a moſt uncommon degree: for being one of the fleet in the Channel cruize the year before, almoſt the whole crew either died at ſea, or were ſent to the hoſpital upon arriving at Portſmouth. This ſhip, after refitting, was pretty heal-

thy for a little time; but, probably from the influence of the old adhering infection, ſhe became extremely ſickly immediately after joining our fleet, and ſent two hundred men to the hoſpital the firſt two months after arriving in the Weſt Indies. Moſt of theſe were ill of the dyſentery.

The Pegaſus frigate arrived with the ſhips from Gibraltar, and we have here an inſtance of the ſuperior health commonly enjoyed by this claſs of ſhips over ſhips of the line; for when ſhe was diſpatched to England in the end of April, there had not been a man taken ill from the time of her arrival on the ſtation.

This ſeaſon was a very active one in the operations of war; for, beſides the general battle of the 17th of April, there were two partial actions in May; and, from the 15th of the former month till the 20th of the latter, our fleet was conſtantly in the face of the enemy's, except for a few days that it was refitting at St. Lucia after the firſt battle. This was extremely haraſſing to the men, not only from the inceſſant labour neceſſary in the evolutions of the fleet, but by their being conſtantly at quarters with the

ſhips

ſhips clear for action. In that ſituation, they had nothing to ſleep upon but the bare decks; for it is the practice in ſhips of war, when about to come to action, to remove the hammocks and bedding from between decks, where they might embarraſs the men in fighting, and to employ them in barricading the ſhip, which is done by placing them in ranges on the gunwale, to cover the men from the enemy's grape and ſmall ſhot. Theſe hardſhips were productive of ſome ſickneſs, though much leſs than might have been expected; for the weather is at all times warm, and it was at this time extremely moderate and dry. Beſides, we ſhall ſee in other inſtances as well as this, that, in the ardour inſpired by the preſence of an enemy, men are leſs exhauſted by their exertions and leſs ſuſceptible of noxious influence, than on ordinary and leſs intereſting occaſions.

Almoſt the whole of the ſick and wounded, to the number of 750, were put on ſhore at Barbadoes, where all the fleet arrived on the 22d of May, except three 74 gun ſhips, which were ſo damaged in the battles that they could not beat to windward, and bore away for St. Lucia.

I now began to keep regular and methodical accounts of the ſickneſs and mortality in the fleet, though in a manner more imperfect and leſs accurate than was afterwards adopted. I was embarked on board of the Sandwich, where the Commander in Chief had his flag, ſo that I was always preſent with the main body of the fleet, whether at ſea or in port.

A form of monthly returns * was adopted, which, as well as other points of method, was afterwards improved.

After

* The following may ſerve as a ſpecimen of theſe returns:

STATE of HEALTH of His Majeſty's Ship ALCIDE, Carliſle Bay, Barbadoes, 1ſt June, 1781.

Sick now on Board.		Died in the courſe of laſt Month.		Sent to the Hoſpital in the courſe of laſt Month.
Fevers - - -	4	Of Fever	1	Ill of Scurvy 35
Flux - - -	5			
Scurvy - - -	26			
Catarrh and Rheumatiſm -	7			
Total -	42			

REMARKS.

During the courſe of laſt month we had one hundred and fourteen of the men, who contracted the ſcurvy in the

After collecting the returns for each month, I made abſtracts of them in tables; in one column of which the complement of each ſhip is ſet down, in order to form calculations of the comparative prevalence and mortality of different diſeaſes at different times. One of the abſtracts is here inſerted, (Table I. p. 9.) by way of ſpecimen, and the proportional reſult of them for fourteen months, is ſet down in another table, (Table II. p. 16.)

Though

the late long cruiſe, recovered by the uſe of limes, which were procured at Montſerrat. A pint of wine, with an equal quantity of water, made agreeable with ſugar and tamarinds, is ſerved to each patient daily. The regimen is exactly the ſame as mentioned laſt month.

Since we came into port, very few have been ſeized with ſcurvy, but ſeveral complain daily of fluxes and feveriſh complaints, none of which ſeem at preſent to be of any conſequence.

Four patients have laſt month complained of an almoſt total blindneſs towards evening, accompanied with head-ach, vertigo, nauſea, and a ſenſe of weight about the præcordia. The pupil is then extremely dilated, but contracts readily when a ſtrong light is preſented to it. Two of them had the ſcurvy in a high degree, one of them ſlightly, and the other ſeemed entirely free from it. I am not well acquainted with the nature or cure of this diſeaſe, which I believe is called Nyctalopia by ſome ſyſtematic writers.

Though this laſt exhibits a tolerably juſt view, yet it may be remarked, as one imperfection, that there was no diſtinction made at this time in my returns between the killed and thoſe who died of diſeaſe; ſo that in the month of May, which ſtands firſt, the proportion is too high; for there were ſixty-four killed, and two hundred wounded, in the two actions of that month.

I gave thoſe who were affected with it an emetic, which brought up a great deal of bile, and relieved the ſymptoms both of the head and ſtomach. This encouraged me to a repetition of it, which ſeemed alſo to be attended with benefit. I likewiſe applied bliſters behind the ears, and gave bark and elixir of vitriol, with the antiſcorbutic courſe, to thoſe that required it.

I can form no probable conjecture concerning the cauſe of this diſeaſe. I have obſerved a dilatation of the pupil in ſcorbutic patients, and they complained of a cloud before their eyes, with imperfect viſion, which diſappeared as the ſcurvy went off.

WILLIAM TELFORD.

To Dr. BLANE,
Phyſician to the Fleet.

TABLE I.

ABSTRACT OF RETURNS, 1st JUNE, 1781.

SHIPS' NAMES.	Complement.	Sick and Wounded on Board.	Sent to the Hoſpital in the courſe of laſt Month.	Died on Board in the courſe of laſt Month.
Sandwich - - -	732	28	36	2
Barfleur - - - -	767	133	22	1
Gibraltar - - -	650	67	88	10
Triumph - - -	650	7	9	2
Centaur - - - -	650	45	26	5
Torbay - - - -	600	31	57	5
Monarch - - -	600	62	14	2
Terrible - - -	600	85	24	1
Alfred - - - -	600	57	38	1
Ruſſel - - - -	600	44	134	7
Alcide - - - -	600	42	35	1
Shrewſbury - -	600	30	23	5
Invincible - - -	600	50	63	9
Reſolution - - -	600	107	54	3
Ajax - - - -	550	20	10	2
Princeſſa - - -	560	88	40	5
Belliqueux - -	500	19	0	1
Prince William -	500	25	14	2
Panther - - - -	420	16	6	0
Triton - - - -	200	5	1	0
Hyena - - - -	200	11	0	0
Cyclops - - -	200	5	2	0
Total - - -	11,979	977	696	64

The main body of the fleet lay at Barbadoes till the 6th of June, and the men had recruited extremely by their ſtay there; for vegetables, fruit, and other refreſhments, can be procured at an eaſier rate, and in much greater plenty, at this iſland, than any other on the ſtation.

The fleet arrived at St. Lucia the next day after it ſailed from Barbadoes, and remained there till the 18th of June. The whole of this month was ſhowery at this iſland, though it is not accounted the common rainy ſeaſon; but more rain falls here than at any of the other iſlands at that time in our poſſeſſion, being the moſt mountainous, as well as the moſt woody and uncultivated, of them all. Theſe rains produced ſome increaſe of ſickneſs, but very little, when compared to what took place at the ſame time in the army on ſhore, and in the ſhips refitting at Carenage. There died about this time from fifty to fifty-five men every week in an army of not quite two thouſand men.

The difference in point of health between the Carenage (which, as the word implies, is

is the place where ſhips go to be hove down, or otherwiſe repaired) and Gros-Iſlet Bay, where the main body of the fleet lay, affords a ſtriking proof of the effects of ſituation. The Carenage is a land-locked creek, with a marſh adjacent to it, whereas the other is a road open to the fine air of the ſea, the only land ſheltering it to windward being a ſmall, dry iſland, conſiſting of one hill, of half a league in circumference, and ſome of the cliffs of the main iſland of St. Lucia.

The increaſe of ſickneſs here was farther prevented by the men having little labour to perform on ſhore, nor any haunts to encourage intemperance; a vice which the Admiral endeavoured ſtill more effectually to prevent, by ordering all the rum ſtills in the neighbourhood to be deſtroyed.

It may be proper here to introduce a general account of the ſeaſons and temperature of the Weſt Indies, as there will be frequent occaſion hereafter to make alluſions to them. With regard to the heat, though the range of the temperature is very ſmall, in compariſon of what it is in Europe, the variations follow the ſame ſeaſons; for July and Auguſt are the hotteſt months, and December

cember and January the cooleſt. This we would naturally expect, as our plantations lie all in the northern hemiſphere, between the 10th and 20th degree of N. latitude, and therefore bear the ſame relation as Europe does to the ſun's annual courſe. The hurricanes happen in the ſame ſeaſon in which the periodical rains chiefly fall, that is, in the months of Auguſt, September, and October, which are called the hurricane months, and this is alſo the moſt unhealthy ſeaſon. The time of the year which is moſt apt to be rainy, next to this, is from the middle of May to the middle or end of June, but this is not invariable. The loweſt I ever obſerved the thermometer was at 69°. This was at ſunriſe in Barbadoes in December. It ſtands very commonly at 72° at ſunriſe, in the cool ſeaſon, riſing to 78° or 79° in the middle of day. In the hot ſeaſon, the common range is from 76° to 83°. It ſeldom exceeds this in the ſhade at ſea; and the greateſt height at which I ever obſerved it in the ſhade at land was 87°. This is far ſhort of the extremes of heat which are experienced at certain ſeaſons on the continent of North America, even very far north. In Pennſylvania and New York, and

and even Canada, the thermometer, I have been aſſured, riſes frequently above 90°. It does ſo commonly enough in the continental parts of the Eaſt Indies; but in the Iſlands * there the heat is much the ſame as in the Caribbee iſlands. The heat therefore in theſe iſlands may, comparatively ſpeaking, be conſidered as moderate and ſteady.

The comparative mortality in June is ſmall, owing to the fleet's having been cleared of all the bad caſes at Barbadoes before it ſailed from thence. Though the proportion of ſick in July is leſs, that of the mortality is greater, (ſee Table II.) which ſeems to be owing to this circumſtance, that the caſes taken ill during the rainy weather of June did not terminate fatally till the ſucceeding month.

In the courſe of this ſummer the fleet was reinforced by ſeveral ſhips of the line from England. The Triumph arrived in May, without any ſick on board; but a flux prevailed a few weeks afterwards, without any evident cauſe, except the influence of

* See Marſden's Hiſtory of Sumatra.

the

the climate, and the expoſure and fatigues during the operations of May. The diſeaſe, however, ſoon ſubſided, and the ſhip being kept in excellent order and diſcipline, continued healthy during all the remaining time in which ſhe ſerved with us.

In June, the Ruſſel, of 74 guns, arrived from North America, and the Shrewſbury, a ſhip of the ſame rate, from England. The former left England in 1778, but was obliged to put back by ſtreſs of weather and ſickneſs, and upon arriving afterwards on the coaſt of America, was extremely afflicted both with fevers and the ſcurvy. Theſe were removed to the hoſpital, and this ſhip had become free of all ſickneſs before ſailing for the Weſt Indies, except that a few of the men were ſeized with fevers, and ſhe remained healthy after arriving there, not ſuffering from any regular attack of ſickneſs, ſuch as affected the ſhips in general from Europe. The Shrewſbury left England healthy, but was ſoon attacked with a fever and flux, which continued to prevail till the end of the year.

The fever in theſe two ſhips reſembled rather

rather the low ſhip fever of Europe than the bilious one peculiar to the climate. This laſt, indeed, ſeldom or never prevails to a great degree on board of a ſhip, unleſs it has been caught on the watering duty, or from ſome other expoſure to the air of the land. I have, however, known a few inſtances of bilious fevers in men who never had been on ſhore from the time they left England; I have even known men of the ſame deſcription attacked with intermittent fevers, which are ſuppoſed to depend ſtill more on land air. This is perhaps owing either to the quantity of water in a great ſhip, part of which is always more or leſs putrid, or to the freſh-cut wood of the country taken on board for fuel, the ſteam of all which muſt reſemble a good deal the effluvia of woods and marſhes, which are ſuppoſed to give riſe to intermittents.

In the beginning of July our fleet was reinforced with the Culloden, Egmont, and Centaur, all of 74 guns. In the end of the ſame month we were joined by the Alcide and Torbay, of the ſame rate, and alſo directly from England. The fleet was at this time at St. Chriſtopher's, having arrived there

there on the 22d of the month, with a large convoy from England, which had joined it at St. Lucia, under protection of the Thunderer and Berwick, two ships of the line, which being bound to Jamaica, I do not reckon as belonging to our fleet.

TABLE II.

Shewing the proportional Sickness and Mortality in relation to the whole Numbers on board, for fourteen Months.

MONTHS.	Proportion of Sick and Wounded on board on the First of the Month.	Proportion of Sick and Wounded sent to the Hospital in the Course of the Month.	Proportion of Deaths on board in the Course of the Month.
	ONE IN	ONE IN	ONE IN
May, 1780 -	18½	20½	87
June - - -	13	68½	418
July - - -	17½	80	163
August - - -	18	227	80
September - -	9	6	188
October - -	14	25	0
November - -	33½	192	265
December - -	16	67	185
January, 1781	14	60½	316
February - -	18	413	214
March - - -	15½	30	201
April - - -	11	59	169
May - - -	9½	17	188
June - - -	12	40	701
Mean Proportion -	15½	93	227

CHAP. II.

THE hurricane months approaching, the ſeaſon for active operations in the Weſt Indies was now over. The whole force of the enemy, conſiſting of thirty-ſix French and Spaniſh ſhips of the line, having gone to St. Domingo in the end of July; ten ſail of the line were detached after them from our ſtation, for the protection of Jamaica. The Admiral ſailed for North America in Auguſt, with eleven ſhips of the line, leaving ſix for the protection of the iſlands.

There was little alteration in the general ſtate of the ſick during the voyage to America, and indeed we found no diminution of the Weſt-India heat, which at this ſeaſon is at the greateſt height, until we came to the 33° of N. latitude.

The only material alteration in point of health was in the Alcide and Torbay, which had arrived from England with a few men ill of fevers; but in the courſe of this

voyage theſe two ſhips became as unhealthy as any that ever came under my obſervation. There was a greater number of ſick on board of them than of all the fleet beſides, and it increaſed to ſuch a degree, that upon their arrival at New York, which was in the middle of September, after a paſſage of three weeks, near one half of their men were unfit for duty. In the Alcide it was a fever that raged; in the Torbay it was a dyſentery; and the unuſual degree of ſickneſs and mortality which appears in the Table for the month of September, was owing to the very ſickly ſtate of theſe two ſhips.

We ſhall hereafter ſee reaſon for ſuppoſing that fever and dyſentery proceed from the ſame cauſe; and as both theſe ſhips arrived from England in a ſimilar ſtate with regard to health, fevers would probably have been the prevailing diſeaſe in both; but a part of the 87th regiment, then ſerving as marines in the fleet, was put on board of the Torbay at St. Chriſtopher's, and ſome of them being ill of the dyſentery, probably gave this turn to the diſeaſe which afterwards prevailed on board. I have formed a Table to ſhew the fluctuating ſtate of theſe two diſeaſes,

[To face Page 19.]

TABLE III.

Shewing the Number of FEVERS and FLUXES on board on the First of each Month, and the Number sent to the Hospital in the Course of the Month.

SHIPS' NAMES, AND Date of their Arrival.	MAY, 1780.				JUNE.				JULY.				AUGUST.				SEPTEMBER.				OCTOBER.				NOVEMBER				DECEMBER.				JANUARY.			
	Fever		Flux.		Fever.		Flux.		Fever.		Flux.		Fever.		Flux.		Fever.		Flux.		Fever.		Flux.		Fever.		Flux.		Fever.		Flux.		Fever.		Flux.	
	On board.	Sent to the Hospital.	On board.	Sent to the Hospital.	On board.	Sent to the Hospital.	On board.	Sent to the Hospital.	On board.	Sent to the Hospital.	On board.	Sent to the Hospital.	On board.	Sent to the Hospital.	On board.	Sent to the Hospital.	On board.	Sent to the Hospital.	On board.	Sent to the Hospital.	On board.	Sent to the Hospital.	On board.	Sent to the Hospital.	On board.	Sent to the Hospital.	On board.	Sent to the Hospital.	On board.	Sent to the Hospital.	On board.	Sent to the Hospital.	On board.	Sent to the Hospital.	On board.	Sent to the Hospital.
Sandwich, 16th March	6	0	16	19	3	0	12	0	10	5	16	3	20	0	5	0	16	4	5	2	5	9	4	0	3	0	5	0	8	0	10	0	9	0	1	0
Terrible, 16th March	0	0	40	20	0	3	86	75	3	25	60	24	25	0	30	13	19	12	41	9	2	0	3	0	continued quite healthy.											
Triumph, 7th May -				0	0	0	0	0	0	0	32	17	5	0	7	0	0	0	3	0	continued healthy.															
Ruſſel, 18th June - -									22	0	0	0	10	3	0	0	continued healthy.																			
Shrewſbury, 26th June									5	0	0	0	14	0	12	0	20	0	20	0	No Return, the Ship being abſent.								0	0	13	0	1	0	7	0
Alcide, 30th July - -													17	0	0	0	54	0	3	22	20	2	59	37	0	0	23	10	0	0	14	0	6	5	17	0
Torbay, 30th July - -													6	0	3	0	3	0	169	143	3	0	12	0	6	0	5	0	0	1	22	30	5	0	10	1
Monarch, 22d Nov. -																													3	0	2	0	5	2	15	4
Alfred, 22d Nov. - -																													6	0	5	0	15	6	11	8

eaſes, and this was one of my firſt and moſt imperfect attempts towards a medical hiſtory of the fleet in a methodical way. (Table III.)

There was but little ſickneſs in the reſt of this ſquadron, except in the Terrible, where the dyſentery prevailed a good deal. None of the ſhips of the line which we found in the Weſt Indies, upon our arrival there, were now in company, except the Yarmouth, and this was the moſt healthy of all the ſhips that went to North America.

The health of the fleet was very much recruited by the ſtay in America, though it was ſhort; for the men were ſupplied with freſh meat and ſpruce beer, and they enjoyed the two fineſt months of the year in that temperate climate. The ſquadron left New York in the middle of November, and though diſperſed by a violent ſtorm, all the ſhips arrived ſafe in the Weſt Indies before the middle of December.

In October the fleet had attained ſuch a degree of health, that though the calculation in the Table is made from five of the

moſt ſickly ſhips, no death happened in this month on board of any of them. In November the mortality was alſo inconſiderable, though the ſhips left in the Weſt Indies are included in the calculation; which, had it been made upon thoſe only that went to North America, the deaths would have been no more than one in ſeven hundred and eleven in this month, which is rather leſs than that of any other month in the Table.

The amendment in health, in conſequence of the change of climate, was moſt remarkable in the Terrible, which, by the time ſhe left America, had entirely got rid of the violent dyſentery that had prevailed for ſome time on board. This ſudden change in the health of this ſhip was evidently owing to the great attention of the Captain to cleanlineſs and diſcipline, and no leſs to the aſſiduity and abilities of the Surgeon. The Alcide ſtill continued ſickly, though not ſo much ſo as the Torbay. The former had ſailed on a cruiſe in October, and having met with very rough weather, the ſick liſt was thereby increaſed. The dyſentery now prevailed in that ſhip, as well as

fevers, and thoſe men chiefly were attacked with fevers who were ill of the ſcurvy, or recovering from it. This was not very common; and there were ſeveral other remarkable particulars with regard to the fevers in this ſhip; for her men were not only uncommonly ſubject to this diſeaſe, both in America and the Weſt Indies, but to all the various forms of it; the low infectious ſhip fever of Europe, the bilious remitting, and the malignant yellow fever of hot climates. It would appear from this, as well as other inſtances, that a ſhip may aſſume, as it were, a particular conſtitution, or a tendency to ſome particular diſeaſe, for a length of time, and this depending on ſome lurking and adhering infection, or the manner in which ſhe may have been victualled, watered, or manned, the habits in point of diſcipline, ventilation, and cleanlineſs, and the accidental expoſure to cold, fatigue, or land air.

The great benefit derived to the health of the fleet, from the change of climate, as well as other reaſons, juſtified the Admiral in going to North America. Upon our return we found there was great good fortune in it,

as well as wiſdom; for there had happened on the 10th of October a more violent hurricane than any in the memory of man, and the ravage it made both by ſea and land is, perhaps, unparalleled in hiſtory. Several of the ſhips of the line were expoſed to it; but though they ſuffered extremely, and were in the utmoſt danger, none were loſt. Two of them happened to be at Antigua, which was out of the track of this hurricane, as it extended only from the 12th to the 15th degree of N. latitude: ſo that the only iſlands that ſuffered by it were Barbadoes, St. Lucia, St. Vincent, and Martinico.—Four frigates, and as many ſloops of war, either foundered or were wrecked, and about one thouſand ſeamen periſhed in them. One of the buildings of the hoſpital at Barbadoes was entirely demoliſhed by the impetuoſity of the ſea, which, having riſen to a great height, daſhed a ſhip againſt it, and twenty-three ſeamen were buried in the ruins *.

The

* Although this hurricane, in itſelf and its conſequences, was ſo deſtructive to the lives and health of men, yet, with regard to the inhabitants on ſhore, it had a ſurpriſing and unexpected effect in mending their health.

The Montague ſuffered moſt on this occaſion, and was alſo moſt ſubject to ſickneſs and mortality, brought on in conſequence of the great fatigue and hardſhips of the men in bringing her into port and refitting her; for the ſhip was almoſt torn to pieces both in the rigging and hull, and the bedding and other neceſſaries and conveniencies were

health. I wrote an account of this hurricane to the late Dr. William Hunter, who communicated it to the Royal Society, and the following paſſage is extracted from it:

" The conſequences of this general tumult of nature, " on the health of man, was none of the leaſt curious of " its effects. I made much inquiry on this head, not " only of the medical gentlemen who had the charge of " hoſpitals, and of the phyſicians of the country, but of " the inhabitants, and every one had ſome cure to relate " either of themſelves or their neighbours, in a variety of " diſeaſes. Nor could I find that either thoſe who were " in health, or thoſe who were ill of any diſeaſe whatever, ſuffered from it, otherwiſe than by its mechanical " violence; but, on the contrary, that there was a general " amendment of health. This is a fact, which I could " neither credit, nor would venture to relate, were it not " ſupported by ſo many concurring teſtimonies. It had " a viſible good effect on the acute diſeaſes of the climate. " The chronic fluxes, of which there were then ſome at " the naval hoſpital, were cured or much relieved by it. " But the diſeaſes upon which it had moſt evident and " ſenſible effects, were pulmonic conſumptions. Some

were entirely deſtroyed. The fever that prevailed on board at this time was of the moſt malignant kind known in this climate; and the worſt caſes aroſe in watering, and the other neceſſary duties on ſhore, from which the men would ſometimes return frantic, and die in a few hours. There was a party of ſoldiers on board; and as they were

" recent caſes of phthiſis, and even the acute ſtate of " pleuriſy, was cured by it; and in the advanced and in- " curable ſtate of it, the hectic fever was removed, and " remarkable temporary relief afforded. A delicate lady " of my acquaintance, who was ill of a pleuriſy at the " time, and paſſed more than ten hours in the open air, " ſitting generally ſeveral inches deep in water, found " herſelf free of complaint next day; had no return of it; " and when I ſaw her a few weeks after, was in much " better health and looks than uſual. The people ob- " ſerved that they had remarkably keen appetites for " ſome time after, and the ſurviving part of them became " uncommonly healthy; ſome of both ſexes, whom I " had left ſallow and thin a few months before, looking " now freſh and plump.

" It is very difficult to account for this, as well as every " thing elſe in the animal œconomy; but it was probably " owing in part, at leaſt, to the very great coldneſs and " purity of the air from the upper regions of the atmo- " ſphere."

It is obſervable that long calms are extremely favourable to epidemic diſeaſes, particularly when concurring with heat. It is remarked in Maitland's Hiſtory of London,

were not called upon to perform any duties on ſhore, they had but little ſickneſs in compariſon of the ſailors.

The other ſhips having ſuffered leſs from the ſtorm, were alſo leſs ſickly, as it was not neceſſary for them to remain ſo long in the unhealthy Carenage to repair.

The only diſeaſe that prevailed at this time, in theſe two ſhips, was fever, there

London, that for many weeks before the breaking out of the laſt plague in this city, which was in the end of ſummer 1665, there had not been for many weeks before the leaſt breath of wind, not even enough to turn a vane. The like was obſerved at Philadelphia before the breaking out of the yellow fever in 1792, the ravage of which was nearly equal to that of the peſtilence. And the frequent prevalence of direful epidemic fevers in the Weſt India iſlands, above what is known in other tracts ſimilarly circumſtanced in point of climate, is probably owing to that particular condition of the atmoſphere which renders this part of the world liable to hurricanes. This, according to * Dr. Franklyn, conſiſts in a want of due admixture in the ſeveral *ſtrata* of the atmoſphere. It is in the agitation producing this admixture that the ſalutary operation of wind conſiſts. It is farther in favour of this opinion, that theſe epidemics begin to rage a little before the periodical return of the hurricane ſeaſon, and we have ſeen that the effect of theſe convulſions of nature is to produce a more healthful atmoſphere.

* See Eſſays by Dr. Franklyn.

being

being few or no fluxes, though they had been ſo frequent in the former part of the year. Though fevers and fluxes depend on the ſame general cauſes, yet when theſe cauſes exiſt in a higher degree, it would appear that they are more apt to produce fevers. Thus the exhalations of the earth from marſhes are more apt to produce fevers; and mere exceſſes of heat and cold, or moiſture, are more apt to produce fluxes; juſt as in Europe a catarrh, which may be conſidered as a local febrile affection, as well as a dyſentery, will be excited by expoſure to cold or damp, without any ſpecific bad quality in the air.

The Ajax and Montague are the only two ſhips of thoſe left in the Weſt Indies, which are included in the eſtimate of ſickneſs and mortality in November and December, and they bear a very great proportion to the whole; for out of forty-four that died in fourteen ſhips of the line in November, twenty died in the Montague, and five in the Ajax; and out of forty-three, the whole number of deaths in December in twenty-one ſhips of the line, ten were of the Montague, and eleven of the Ajax.

CHAP. III.

WE are now come to that period in which our fleet was reinforced with ſeven ſhips of the line, which arrived at Barbadoes from England on the 5th of January, 1781, under the command of Lord Hood. This addition, with two which had arrived in November, made the force upon this ſtation again amount to twenty-one ſhips of the line.

The whole fleet was tolerably healthy during this month, the ſeaſon being dry and cool. There was, however, a ſmall increaſe of ſickneſs at this time, and it was owing to a deſcent made on St. Vincent's in December. The land troops, (of whom there was ſtill a regiment on board of the fleet) the marines, and ſome of the ſeamen, had been on ſhore for one night only; but many of them having lain on the ground, ſome having been intoxicated, or having eaten to exceſs of ſugar-cane and fruit, caught fevers and fluxes, which increaſed the proportion of diſeaſes and deaths in the following months, as appears by the Table.

I have

I have exhibited in another Table, a view of the ſickneſs and mortality of this fleet for the five ſucceeding months. (Table IV.) This account, as well as moſt of thoſe that are to follow, is confined to three diſeaſes, that may be called the ſea epidemics. Theſe are, fever, flux, and ſcurvy.

The whole fleet aſſembled at Barbadoes on the 13th of January, but no ſervice was undertaken till the accounts of the Dutch war arrived on the 30th of that month. In conſequence of this intelligence, the greater part of the ſhips of war went againſt St. Euſtatius, which was taken on the 3d of February.

Ten days after this a ſquadron of ſeventeen ſhips of the line was ſent to cruiſe to windward of Martinico, with a view to intercept a French ſquadron which was then ſaid to be on its paſſage from Europe. The cruiſe was there continued for ſix weeks; after which ſmall diviſions of the ſhips were ſent to water and refit, by turns, at St. Lucia, and were relieved by the ſhips left for the protection of that iſland.

Soon

TABLE IV.

Shewing the Number of each Diſeaſe on board on the Firſt of each Month, the Numbers ſent to the Hoſpital, and Dead, in the Courſe of the Month.

SHIPS' NAMES. N.B. Thoſe marked *, arrived with Lord Hood.	FEBRUARY, 1781.									MARCH.								
	Fever.			Flux.			Scurvy.			Fever.			Flux.			Scurvy.		
	On board.	Sent to the Hoſpital.	Dead.	On board.	Sent to the Hoſpital.	Dead.	On board.	Sent to the Hoſpital.	Dead.	On board.	Sent to the Hoſpital.	Dead.	On board.	Sent to the Hoſpital.	Dead.	On board.	Sent to the Hoſpital.	Dead.
Sandwich	8	0	0	4	0	0	2	0	0	8	3	1	4	0	0	2	2	0
* Barfleur	8	0	1	4	0	1	3	0	0	28	4	0	35	0	0	5	27	2
* Gibraltar	25	0	2	4	0	0	4	0	0	8	1	0	0	0	0	6	22	0
Triumph	0	0	1	1	0	1	21	8	0	3	0	0	2	0	1	24	18	1
Centaur	2	0	0	2	0	0	20	0	8	7	0	0	4	0	0	50	0	8
Torbay	6	0	0	11	0	0	1	0	0	7	0	0	8	0	0	8	0	0
Monarch	13	0	3	13	0	0	2	0	0	5	0	0	4	0	0	1	0	0
Terrible	2	0	0	10	0	0	1	0	0	2	0	0	9	0	2	3	0	0
Montagu	40	0	8	14	0	5	4	0	0	§	§	5	§	§	3	§	§	1
Alfred	4	0	0	4	0	0	4	0	1	25	0	0	8	0	1	56	16	2
Ruſſel	0	0	0	7	0	1	2	1	0	7	0	0	8	2	0	0	61	5
Alcide	1	0	1	9	0	0	1	0	0	1	0	0	1	0	0	15	0	0
* Invincible	0	0	0	0	0	0	0	0	0	6	1	0	1	0	0	5	6	0
Reſolution	1	0	0	7	0	1	0	0	0	6	0	0	5	0	0	1	0	0
Shrewſbury	8	0	0	0	1	1	6	7	0	5	0	1	6	0	0	0	0	0
Ajax	8	0	1	6	0	5	3	0	1	2	0	2	10	0	5	6	0	6
* Princeſſa	8	0	1	3	0	1	0	0	0	6	0	5	2	0	0	4	102	2
Intrepid	18	1	1	10	4	0	1	0	0	10	0	0	9	0	0	0	0	0
* Belliqueux	11	0	0	10	0	5	0	0	0	3	1	2	52	0	1	0	1	0
* Prince William	21	0	0	17	0	0	4	0	0	23	12	0	47	62	5	6	10	0
* Panther	2	0	0	4	0	0	0	0	0	5	0	0	8	0	0	4	0	0
Triton	7	0	0	15	2	0	14	0	0	3	2	0	12	2	0	6	0	0
Hyena	0	0	0	0	0	0	0	2	0	0	0	0	0	1	0	0	0	0
Cyclops	4	1	0	3	0	0	0	1	0	4	0	0	3	0	0	0	0	0
Total	197	2	19	158	7	21	93	19	10	174	24	16	238	67	18	202	265	27

SHIPS' NAMES.	APRIL.									MAY.								
	Fever.			Flux.			Scurvy.			Fever.			Flux.			Scurvy.		
	On board.	Sent to the Hoſpital.	Dead.	On board.	Sent to the Hoſpital.	Dead.	On board.	Sent to the Hoſpital.	Dead.	On board.	Sent to the Hoſpital.	Dead.	On board.	Sent to the Hoſpital.	Dead.	On board.	Sent to the Hoſpital.	Dead.
Sandwich	6	0	2	9	1	1	2	4	0	2	2	1	10	5	0	5	18	0
* Barfleur	24	0	0	25	0	0	33	0	0	12	3	1	16	1	0	54	10	0
* Gibraltar	0	0	1	0	0	0	18	0	0	4	0	0	0	0	0	30	22	4
Triumph	0	0	1	3	0	2	12	0	2	0	1	1	0	0	0	13	8	1
Centaur	2	0	0	3	1	0	55	1	1	0	0	0	2	0	2	15	4	0
Torbay	6	0	0	8	0	0	23	27	2	6	0	0	13	7	0	44	31	0
Monarch	8	0	4	17	0	0	0	0	0	5	2	2	3	0	0	57	11	0
Terrible	0	0	0	10	0	0	4	3	1	0	0	1	10	4	0	5	20	0
Montagu	§	§	§	§	§	§	§	§	§	§	§	§	§	§	§	§	§	§
Alfred	11	0	0	26	0	1	116	44	4	15	10	1	11	3	0	130	25	2
Ruſſel	0	0	0	4	0	1	44	0	3	0	1	0	8	0	0	132	102	4
Alcide	1	0	0	3	0	0	8	16	0	0	0	1	1	0	0	40	35	0
* Invincible	4	0	0	4	0	0	2	0	1	7	0	1	6	8	4	31	54	4
Reſolution	5	0	0	8	0	2	7	0	1	5	2	0	9	0	0	15	45	2
Shrewſbury	4	3	0	0	0	0	4	6	0	3	1	0	5	2	0	22	6	2
Ajax	4	0	1	15	4	2	30	5	10	4	1	1	3	0	0	8	0	1
* Princeſſa	6	0	0	1	0	0	40	0	1	2	0	0	2	0	1	30	40	2
Intrepid	9	§	§	13	§	§	1	§	§	§	§	§	§	§	§	§	§	§
* Belliqueux	0	0	0	3	0	0	2	0	0	0	0	0	2	0	0	2	0	0
* Prince William	19	2	0	147	40	0	16	7	0	5	5	2	53	5	0	7	4	0
* Panther	2	0	0	4	3	0	9	1	0	3	2	0	8	4	0	1	0	0
Triton	2	0	0	2	0	0	0	0	0	2	0	0	4	0	0	0	1	0
Hyena	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0
Cyclops	2	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	115	5	9	317	49	9	428	115	26	76	30	12	166	39	7	641	436	22

SHIPS' NAMES.	JUNE.								
	Fever.			Flux.			Scurvy.		
	On board.	Sent to the Hoſpital.	Dead.	On board.	Sent to the Hoſpital.	Dead.	On board.	Sent to the Hoſpital.	Dead.
Sandwich	2	0	0	3	0	0	10	0	1
* Barfleur	20	0	0	13	0	0	58	0	0
* Gibraltar	3	1	0	4	0	0	48	17	0
Triumph	1	0	0	0	0	0	6	5	0
Centaur	4	0	0	9	0	1	15	0	0
Torbay	16	0	0	6	0	0	9	0	1
Monarch	4	3	1	4	0	0	36	5	0
Terrible	3	1	0	12	0	0	20	1	0
Montagu	§	0	0	§	0	2	§	0	0
Alfred	14	§	§	10	0	0	26	0	0
Ruſſel	0	1	0	19	1	0	14	1	0
Alcide	4	2	0	5	0	0	26	5	0
* Invincible	8	0	0	22	0	0	10	1	0
Reſolution	1	0	0	3	12	0	84	0	2
Shrewſbury	3	§	§	4	§	§	20	§	§
Ajax	2	0	0	2	0	1	6	0	0
* Princeſſa	2	0	0	6	40	0	70	154	0
Intrepid	§	§	§	§	§	§	§	§	§
* Belliqueux	2	0	1	3	0	0	8	0	0
* Prince William	4	4	2	13	3	1	8	7	0
* Panther	3	0	0	8	1	0	1	1	0
Triton	2	0	1	1	0	0	0	1	0
Hyena	3	0	1	2	0	0	5	0	0
Cyclops	§	§	§	§	§	§	§	§	§
Total	101	12	6	149	57	5	480	198	4

N. B. Where the Spaces are marked thus, §, no Return was made.

Soon after this, the whole ſquadron came to leeward of Martinico; and though the former intelligence had proved falſe, the greater part of our fleet ſtill kept the ſea, in order to block up the enemy in Fort-Royal Bay. This they continued to do till the 29th of April, when a French fleet of twenty-two ſhips of the line, from Europe, joined by four from Martinico, forced their way into their own port, preſſing to leeward our fleet, conſiſting only of eighteen ſhips of the line; ſo that the greater part of them did not get into port till they came to an anchor at Barbadoes on the 23d of May.

It was in this ſeaſon of cruiſing, and keeping the ſea, that the fleet contracted ſuch a degree of ſcurvy as had never before been known in the Weſt Indies. This diſeaſe is not ſo apt to ariſe in a hot climate as in a cold one; and the prevalence of it on this occaſion was owing to the men having been for a great length of time upon ſea victualling; for one part of the fleet had not had a freſh meal from the time of leaving America, that is, for ſix months; and that part of it which came laſt from England had been in the ſame circumſtances for ſeven months;

months; nor had any of them been in a place capable of ſupplying vegetable refreſhments from the time they left Barbadoes in the end of January. But though no freſh meat or vegetables could be procured at St. Lucia or St. Euſtatius, yet the ſcurvy did not make ſuch progreſs in the ſhips that lay at anchor there, as in thoſe that were at ſea; and it appears that the time in which it prevailed moſt was, while the greateſt number of ſhips was at ſea, that is, in the month of March. It appears, indeed, by the Table, that there was a greater number ill of this complaint on the 1ſt of May than on the 1ſt of April; but it appears alſo, that more were ſent to the hoſpital in March than in April, and very near half of the May liſt muſt have been taken ill in March *. The difference of being in port and at ſea conſiſts chiefly, 1ſt, In there being plenty of water while in port, ſo that it can be uſed freely, not only to drink, but to waſh the clothes; and we know that cleanlineſs tends greatly to ward off the ſcurvy. 2dly, Though no

* In order to aſcertain more exactly the degree of ſickneſs in each month, a column was afterwards added to the form of the returns, expreſſing the number taken ill of the ſeveral diſeaſes in the courſe of the month.

freſh

freſh meat nor vegetables could be procured at thoſe ports, ſugar, which may be conſidered as a very antiſcorbutic article of diet, could always be procured at a very cheap rate, and the ſeamen, when in port, uſed to exchange their ſalt proviſions for it. 3dly, There is at ſea a diſmal uniformity of life, favourable to indolence and ſadneſs, and therefore tending to haſten the progreſs and aggravate the ſymptoms of the ſcurvy; whereas the change of ſcene and variety of objects, when in port, tend to cheer and amuſe the mind, and thereby to avert this diſeaſe.

The ſquadron that came from England under Lord Hood, ſuffered, upon the whole, much leſs from acute diſeaſes, during the firſt months of their ſervice in this climate, than the ſhips that arrived with Lord Rodney, which was probably owing, in part at leaſt, to the former having arrived at the drieſt and cooleſt ſeaſon of the year. The Barfleur, however, had a large proportion of all the three prevailing diſeaſes; and large ſhips are in general more ſubject to them than thoſe of a ſmaller rate. But of all the ſhips in the fleet, the Alfred had the greateſt proportion

proportion of the three ſea epidemics. The Prince William ſuffered more than any other ſhip in the fleet from the flux, and the Princeſſa from the ſcurvy. In ſome inſtances, reaſons can be aſſigned for the prevalence of particular diſeaſes in particular ſhips, ſuch as accidental infection, or the manner in which they have been victualled, manned, or diſciplined; but in many caſes the cauſe is ſo ſubtile or obſcure as to elude our inquiry.

The moſt healthy of the new ſquadron, during this campaign, were the Belliqueux and Panther; the former was a new ſhip, and came from England with a very irregular and ill-diſciplined crew. Soon after arriving in this climate, ſhe was threatened with a dyſentery, which, though it ſpread a good deal, did not prove ſevere nor mortal; but being left at St. Euſtatius on this account, while the reſt of the fleet was cruiſing, ſhe ſoon became very healthy, and remained ſo. This is the ſecond inſtance we have had occaſion to remark of a new ſhip being healthy.

The

The Panther preſerved her health by being on ſmall ſeparate cruiſes, and frequently in port, not being attached to the main ſquadron. The Sandwich was the only other ſhip not engaged in the long cruiſe.

Of the ſhips lately from England, that were employed in this cruiſe, the Gibraltar ſeems to have been the leaſt ſickly. This ſhip left England healthy; but having received a draft of dirty men when upon the eve of ſailing, a fever of the infectious kind broke out on the paſſage, ſo that ſhe arrived in the Weſt Indies in a ſickly ſtate. This fever diſappeared very ſoon after; and it is proved by this, as well as other facts, that a warm climate, ſo far from tending to generate, or even to foſter the infection of fever, tends rather to extinguiſh it. The Gibraltar had been put under excellent diſcipline by her former commander, while in the Channel ſervice; and this being afterwards kept up, the men were always clean and regular. This was the Spaniſh Admiral's ſhip, taken by the fleet under the command of Lord Rodney off Cape St. Vincent's, in January 1780. She was then

called the Phœnix, and was of a ſingular excellence both with reſpect to materials and conſtruction; the wooden work being of cedar and mahogany of uncommon thickneſs, and the iron-work proportionably ſtrong. Whether the cedar contributed to the healthineſs, by its balſamic effluvia, I will not pretend to determine.

The Invincible was alſo uncommonly healthy during this cruiſe, which may likewiſe be aſcribed to good diſcipline, and to her having been more than three years in commiſſion before ſailing from England, whereby the men were brought into order, and accuſtomed to each other and to a ſea life. This ſhip was almoſt ſingular in having no acute diſeaſes for ſeveral months after arriving from Europe; but at length paid the tribute to the climate in May and June, as may be ſeen in Table IV.

From the account of the three frigates at the bottom of the liſt in the Table, it appears how much more healthy they are than ſhips of the line. The total complements of the three is exactly equal to that of one ſeventy-four-gun ſhip; but their

whole

whole ſickneſs and mortality is leſs than that of any one ſhip of the line of that claſs, although the Triton was uncommonly ſickly for a frigate.

There ſeem to be ſeveral cauſes for the ſuperior degree of health uſually enjoyed by this ſmaller claſs of ſhips. There is not only leſs chance of mixtures of men in frigates, as their complement is ſmaller, but it is more eaſy for the captain and officers to keep an eye over a few men than a great number; for, in a great ſhip, there are generally men, who, concealing themſelves in the moſt retired parts, no one takes cognizance of them, and they deſtroy themſelves, and infect others, by their lazineſs and filth. In the next place, there is a greater proportion of volunteers and real ſeamen in frigates, and more landmen and preſſed men in ſhips of the line, the former being more in requeſt, on account of the greater chance of prize money. Laſtly, a ſmall ſhip is more eaſily ventilated, and the maſs of foul air iſſuing from the hold, from the victuals, water, and other ſtores, as well as the effluvia exhaling from the men's bodies, is leſs than in a large ſhip.

Many other and more minute remarks might be made on different ſhips in this ſeaſon of hard ſervice; but to do this would be tedious, and the inſpection of the Tables may ſuggeſt obſervations to the reader. There is a ſtriking and inſtructive fact, however, with regard to two ſhips, which I cannot help relating. The Alcide and Invincible, both of ſeventy-four guns, in working to windward, after the action with the French fleet, on the 29th of April, anchored at Montſerrat on the 11th of May, in order to water. They remained there only part of two days, and they procured no refreſhment, except a few buſhels of limes. The ſcurvy then prevailed to a great degree in both ſhips; but between this time and the 23d of May, when they came to an anchor at Barbadoes, ſixty men, who had been confined with this diſeaſe, were diſcharged, as fit for duty, from the ſick liſt of the Invincible, and a hundred and fourteen from that of the Alcide. Theſe were the only two ſhips that had the advantage of the limes; and during theſe twelve remaining days of the voyage the ſcurvy continued to increaſe in all the other ſhips.

The

The fleet was ſupplied with eſſence of malt during all this campaign; and though it was, no doubt, of ſervice, it was far from having that powerful and manifeſt effect that the acid fruits had, and certainly did by no means prevent the ſcurvy in all caſes. I have ſtrong teſtimonies, however, of its beneficial effects from the ſurgeons of ſeveral of the ſhips, particularly of the Gibraltar, Centaur, Torbay, and Alcide, in all of which it was found either to cure the ſcurvy in its firſt beginning, to retard its progreſs, or to mend the appearance of ſcorbutic ulcers, and diſpoſe them to heal.

I had conceived that melaſſes, being a vegetable ſweet, muſt have been a very powerful antiſcorbutic; but the greateſt part of the laſt reinforcement of ſeven ſhips came from England furniſhed with this as an article of victualling, as a ſubſtitute for a certain proportion of oatmeal, which was withheld agreeably to a late very judicious order of the admiralty. But though I am perſuaded that this article of diet mitigated the diſeaſe, it was very far from preventing it; and the Princeſſa in particular, which

ſuffered moſt from the ſcurvy, was well ſupplied with it.

There is reaſon to think that it is not in the vegetable ſweet alone that the antiſcorbutic principle reſides, but in this in conjunction with the natural mucilage, ſuch as exiſts in the malt. I ſuſpect likewiſe that the change which the eſſence undergoes in its preparation tends alſo to rob it of ſome of its original virtue. But the melaſſes are ſtill farther altered by being deprived of the natural mucilage by means of quick lime, with which all ſugar is clarified in the boilers. Dr. Hendy, of Barbadoes, to whom I have been obliged for ſeveral remarks, informed me, that the liquor, before it undergoes this operation, has been found by him to produce the moſt ſalutary effects in the ſcurvy; but as this cannot be had at ſea, we had no opportunity of comparing it with other antiſcorbutics. It is certain alſo that the medical effects of the native ſweet juices are, in other reſpects, very different from what they are in their refined ſtate; for manna, wort, and the native juice of the ſugar cane are purgative; whereas ſugar itſelf is not at all

all ſo *. This affords a preſumption, that they may be alſo different in their antiſcorbutic quality; and there is reaſon to think, from experience, that the more natural the ſtate in which any vegetable is, the greater its antiſcorbutic quality. Vegetables, in the form of ſallads, are more powerful than when prepared by fire; and I know for certain, that the rob of lemons and oranges is not to be compared to the freſh fruit. Raw potatoes have been uſed with advantage in the fleet, particularly by Mr. Smith, of the Triton, who made the ſcorbutic men eat them, ſliced with vinegar, with great benefit. This accords alſo with what Dr.

* I was informed by Captain Caldwell, that when he commanded the Hannibal, of 50 guns, his crew was ſo much afflicted with the ſcurvy, in a paſſage of nine weeks from St. Helena to Crookhaven, in Ireland, that ninety-two men were confined to their hammocks in the laſt ſtage of that diſeaſe, though they had been ſupplied with ſugar at St. Helena, and ſerved with it on the paſſage. They remained three weeks at Crookhaven; at the end of which time every man was fit for duty: and though they had freſh proviſion, they had no freſh vegetables, ſo that their cure is to be aſcribed to the uſe of lemons and oranges, which the Captain very humanely ordered to be purchaſed for them from on board of a foreign ſhip that happened to put into the ſame harbour.

Mertans*, of Vienna, has lately communicated to the Royal Society of London.

When the fleet arrived at Barbadoes on the 23d of May, it was found that the number of ſick on board amounted to ſixteen hundred, and that there was not accommodation for more than two hundred at the hoſpital. As there was hardly any complaint but ſcurvy, the Admiral, at my repreſentation, iſſued an order for ſerving the ſick on board of their own ſhips with fruit and other vegetables and refreſhments, ſuch as milk and ſoft bread. This courſe of diet commenced in the beginning of June; and as the greater part of the fleet was near four weeks thereafter in port, they enjoyed the advantages of it during that time; and the very great diminution of ſickneſs and mortality, which appears by the tables in that month, ſufficiently evinces the benefit derived from it. In leſs than four weeks the fleet, from being very ſickly, became extremely healthy.

It was remarked, that the men recovered faſter on board than on ſhore; and it would

† See Philoſoph. Tranſact. vol. 68.

appear

appear that land air, merely as ſuch, can have but little ſhare in the cure of the ſcurvy, and that the benefit ariſes from the concomitant diet, cleanlineſs, and recreation. The expedient of curing men on board of their ſhips was here ſuggeſted by neceſſity; but it ſucceeded ſo well, that it was adopted afterwards in preference to an hoſpital, which is indeed a uſeful relief to a fleet where there are contagious, acute diſorders; but with regard to ſcurvy, I am convinced, that on foreign ſtations, at leaſt, where the accommodations of the ſick are more indifferent than in England, many advantages would ariſe from ſupplying men with refreſhments on board of their ſhips. It appears that only four men died of this diſeaſe in the whole fleet in the month of June, though there were ſo many ill of it; whereas it appears by the books of hoſpitals, that ſcorbutic men die there in a much greater proportion, and chiefly in conſequence of other diſeaſes, particularly the flux, which they catch by infection, or bring on by intemperance. It is farther in favour of this ſcheme, that great numbers of thoſe ſent on ſhore are loſt by deſertion. It is alſo a great ſaving to Government, the expence not being

ing a fourth part of what it would coſt at an hoſpital.

The fleet left Barbadoes on the 10th and 12th of July, and continued healthy till the greater part of it ſailed for North America in the beginning of Auguſt.

PART I.

BOOK II.

Continuation of the MEDICAL HISTORY of the FLEET, from Auguſt 1781, till the Concluſion of the War in April, 1783.

CHAP. I.

WHEN the main body of the fleet went to America in Auguſt, Lord Rodney went to England for the recovery of his health.—Wiſhing to lay before the public boards ſeveral reforms that ſuggeſted themſelves to me in the courſe of the late ſervice, I accompanied the Admiral, purpoſing to return when the ſeaſon for hoſtile operations ſhould have brought back the fleet from the coaſt of America.

Soon

Soon after arriving in England, I preſented a memorial * to the Board of Admiralty, propoſing ſuch means for the preſervation of the health of the fleet as had occurred to me during my paſt ſervice.

The Board of Admiralty conſidered this memorial with all the attention that could be expected in the general hurry of ſervice, inſeparable from a great and extenſive war; and I am happy in being able to ſay, that, in conſequence of my application, moſt of the particulars recommended have ſince been ſo far carried into effect as to produce a practical conviction of their utility.

Lord Rodney having recovered his health, hurried out to his ſtation with all the force that could then be equipped, as the enemy were expected at the Caribbee Iſlands, with a ſuperior force, after their ſucceſſes againſt us in the autumn campaign in America.

I had again the honour to accompany the Admiral. He firſt ſailed from Portſmouth,

* See Appendix to Part II.

with

with four ſhips of the line, on the 14th of December, and was to have been joined by two more that lay ready at Plymouth; but by the time we arrived off this harbour the wind became contrary, whereby we were detained there till the 14th of January, 1782. During this time more ſhips were got ready, and ſix were added to the ſquadron; for the public anxiety at that time called forth every exertion to ſtrengthen this reinforcement, upon which the fate of the whole Weſt Indies was ſuppoſed to depend.

This fleet cleared the Channel in the midſt of a ſtorm, and with the wind at the ſame time ſo ſcanty, that we barely weathered Uſhant; but Lord Rodney's perſeverance and reſolution, ſtimulated by the exigency of the occaſion, baniſhed all heſitation and timidity. The rough weather, and contrary winds, continued through the variable latitudes; but having met with freſh blowing trade winds, common at that ſeaſon, we had the good fortune to get ſafe to Barbadoes with the whole ſquadron on the 19th of February.

All

All the twelve ſhips * of this reinforcement had been on ſervice for a conſiderable length of time ſince they had been laſt commiſſioned, except the Anſon, a new ſhip, which had never before been at ſea, and the Fame and Yarmouth, which had lately undergone a thorough repair, ſince which time they had been only for a few weeks at ſea in the Channel before they were ordered on this ſervice.

The only ſhip that was ſickly when we left England was the Fame, on board of which ſome preſſed men, with the infection about them, had been received from the Conqueſtadore guardſhip; and the fever which broke out in Plymouth Sound, where I was firſt ſent for to viſit that ſhip, was probably owing to the infection which theſe men brought with them. The other ſhips were, upon the whole, healthy, for it appeared by the weekly accounts delivered to the Admiral, that the mortality, including even that of the Fame, for the four weeks

* They were the Formidable and Namur of 90 guns; the Arrogant, Conqueror, Marlborough, Hercules, and Fame, of 74 guns; the Yarmouth, Repulſe, Prothée, Anſon, and Nonſuch, of 64 guns.

before

before we ſailed, had been only one in thirteen hundred, and that there had been about one in twenty-nine on the ſick liſt.

An opportunity offered on this occaſion of comparing the health of ſhips of war in England with that in the Weſt Indies. The health of the fleet in general at home was at this time about the proportion above mentioned; but it is to be remarked, that it was healthier then than in the former part of the war.

Plymouth hoſpital, which is calculated for twelve hundred men, was not half full; and there were not at this time more than ſix hundred men at that of Haſlar, at which the ſick of the ſhips at Portſmouth are received, and which is calculated to contain two thouſand; but the latter was generally full during the firſt two or three years of the war, from the great fleets that put into this harbour. At one time part of the ſick were even obliged to be accommodated with tents in the neighbourhood of the hoſpital, for want of room. But towards the end of the year 1781 the infectious fever, which conſtitutes a great part of the ſickneſs

in

in the European ſeas, was almoſt extirpated, and in a cruiſe of five weeks in the north part of the Bay of Biſcay, under Admiral Darby, in September and October of this year, only ſix men were buried in that time from twenty-eight ſhips of the line.

This was chiefly owing, as I apprehend, to the length of time which the war had continued, in conſequence of which the men of the reſpective ſhip's companies had been accuſtomed to each other, and habituated to the mode of life peculiar to a man of war, regulating themſelves according to certain rules of good order and cleanlineſs. The cauſes of the fever above mentioned, as ſhall be more fully illuſtrated hereafter, are chiefly connected with the circumſtances occurring in the beginning of a war, when men of all deſcriptions are mixed, without proper precautions being taken to guard againſt the infection imported from jails or guardſhips. The ſickneſs in the French fleet was ſtill greater in the beginning of the war than in the Britiſh; and this has been the caſe in all the wars of this century. In the fleet commanded by the Comte d'Orvilliers, in 1779, the ſickneſs was ſo great

as

as to disable many of the ships from service, and great numbers of men were landed at Brest, with a fever so malignant as to infect the inhabitants of the town and of the adjacent country. I believe, besides, that the general health prevailing at this time in the fleet in England, was, in part, owing to the sour crout and melasses, which were now supplied more amply than had ever been done before. The entire exemption from scurvy in particular is to be ascribed to these improvements in diet.

There is a tendency in acute diseases to wear themselves out, both in individuals that labour under them, and when the infection is introduced into a community. Unless there was such a *vis medicatrix*, there could be no end to the fatality of these distempers; for the infectious matter would go on multiplying itself without end, and would necessarily destroy every person who might be actually attacked, and would infect every person who might be exposed to it. But animal nature is so constituted, that this poison, after exciting a certain series of motions in the body, loses its effect, so that recovery takes place; and those who happen not

not to be infected at firſt, become in ſome meaſure callous to its impreſſion, by being habitually expoſed to it. There is, therefore, a natural proneneſs to recovery, as well with regard to that indiſpoſition which takes place among a ſet of men living together, as with regard to a ſingle individual who actually labours under the diſeaſe. Thus the moſt prevailing period of ſickneſs is when men are new to their ſituation and to each other, ſo that time of itſelf may prove the means of prevention as well as of cure.

This conſideration, however, ought not to ſuperſede any part of our attention with regard to the ſcurvy, which does not become ſpontaneouſly extinct like acute diſeaſes.

During the three firſt weeks of this paſſage from England to the Weſt Indies, there was wet and boiſterous weather, but it had very little effect in augmenting ſickneſs; and though it not only ſubjected the men to fatigue, cold, and damp, but prevented the ſhips from opening their lower-deck ports till the 2d of February, between the 31ſt and 32d degree of latitude, thereby pro-

ducing close air and moisture where the men sleep, yet, in the whole squadron, from its leaving England till this time, there were only seven deaths, four of which were in the Fame.

The only sea epidemic that made its appearance was the infectious ship fever, which, in many cases, was attended with pleuritic, rheumatic, and other inflammatory symptoms, owing to the cold and wet, to which the men were exposed in the variable latitudes. The warm, dry, fresh breezes which we had during the remainder of the passage, were probably what prevented any bad consequences from the former hardships, for there died only four men from the above-mentioned date till we arrived at Barbadoes; and it appeared by the Admiral's weekly account, that the proportion of the sick neither increased nor diminished from the time we got into a warm climate and fine weather till our arrival on the 19th of February.

This squadron left England with several advantages in point of victualling, which no ships had before enjoyed. They were amply supplied

ſupplied with ſour crout and melaſſes; they had all more or leſs wine, of an excellent quality; and the Formidable had an entire ſupply of it, in place of ſpirits, of which none was put on board. This ſhip had hitherto, and did for ſome months afterwards, enjoy an extraordinary, perhaps an unparalleled, degree of health. What farther contributed to the health of this ſhip was, that ſhe had been long in commiſſion, and moſt of the recruits with which the crew had been completed were men turned over from other ſhips. There was alſo extraordinary medical attention paid, particularly in watching the firſt beginnings of complaints.

Upon the arrival of the ſquadron at Barbadoes, it was found, that, the two hoſtile fleets having returned from North America in the beginning of December, the campaign had opened with the ſiege of St. Chriſtopher's, which had been inveſted by twenty-eight ſhips of the line, and a conſiderable army. Our fleet, under Lord Hood, having attempted, without ſucceſs, to relieve this place, Lord Rodney made haſte to join it with the reinforcement he had brought

from England. He remained at anchor at Barbadoes only one night, and in a few days came off Antigua, where he was informed of the ſurrender of St. Chriſtopher's; and here, on the 25th of February, he was joined by the reſt of the fleet in their return to windward.

CHAP. II.

THE fleet which was found in the Weſt Indies conſiſted of all the ſixteen that went from thence to America in Auguſt, 1781, (except the Terrible, which had been loſt) together with ſix ſhips of the line * from the American ſtation, the St. Albans, which arrived from England in November, and the Ruſſel, which had remained in the Weſt Indies during the hurricane months. They were all extremely healthy, having only one man in twenty-eight on the ſick liſt, and very few had been ſent to hoſpitals.

* Theſe were the Prince George, of 90; the Bedford, Canada, and Royal Oak, of 74; the America and Prudent, of 64 guns.

This

This fleet, after arriving from America, had lain at anchor for three weeks at Barbadoes, where it had the advantage of the vegetable refreſhments which that iſland affords; but during three weeks that it lay at anchor, in the face of the enemy, at St. Chriſtopher's, the men were excluded from all communication with the ſhore, and had no vegetable food, except ſome yams, with which they were ſupplied from Antigua, in place of biſcuit, of which there was at this time a ſcarcity. Theſe ſhips had therefore been in no port for ſix weeks, except for a few days that they lay in the road of Antigua refitting, and putting the ſick and wounded on ſhore.

The men had alſo been deprived of their natural reſt, and expoſed to the air during all the time that the fleet was at anchor before St. Chriſtopher's; for they had been twice attacked by the enemy in that ſituation, and were therefore under the neceſſity of keeping the ſhips conſtantly clear for action; yet no increaſe of ſickneſs followed. This might partly be owing to the eagerneſs and alacrity of ſpirits naturally excited in ſuch a ſituation, and alſo to the fleet not lying

under the lee of any land, and having ſprings upon their cables, in order to oppoſe their broadſides to the enemy in one line, ſo that they had all the perflation and all the purity of air which ſhips enjoy when at ſea. The fumigation which ſhips undergo in battle, has alſo been thought to contribute to their health.

To whatever cauſe it was owing, the fleet we found in the Weſt Indies was at this time healthier than that which had juſt come from England; and there was but little difference in the degree of health of the different ſhips that compoſed it. Of thoſe which left the Weſt Indies in Auguſt, and returned in December, the only one that could be ſaid to have any epidemic diſeaſe was the Prince William, which had never got entirely free from the dyſentery that was formerly mentioned as prevailing ſo much on board of this ſhip laſt year. This diſeaſe was kept up, by the ſhip never having been cleared of the men affected with it, and by the crew in general being ill provided with ſlops *, a circumſtance that would render

* This is a term in uſe for the different articles of ſeamen's cloathing, particularly ſhirts and trowſers.

them

them more ſuſceptible of whatever infection they might be expoſed to. It has been doubted whether the dyſentery is infectious, but the facts ſtated here and elſewhere in this work afford abundant proofs of this.

There were alſo ſome remains of the ſame diſeaſe in the Intrepid, the ſeeds of it having been more or leſs continued from the ſummer of 1780, at which time it prevailed to a moſt violent degree. The Alfred had a few of all the ſea epidemics, and had been for a long time before more or leſs in the ſame ſituation, from a neglect of cleanlineſs, particularly of the men's perſons.

The only ſhip in which there was any thing like an epidemic was the Canada. This ſhip, when at home, had for many months before ſhe ſailed been in unremitting ſervice, and very little in port. On the paſſage from England to America, in Auguſt 1781, there broke out a ſevere dyſentery, to which the ſcorbutic habit of the men, from being ſo long at ſea, probably pre-diſpoſed them. Though it had abated much

in February, 1782, it was then by no means extinct, and continued till April. The Prince George had been in commiſſion all the war, and was a model of diſcipline and cleanlineſs, and conſequently of health. This continued till the paſſage from America, when, upon the firſt cold weather after leaving New York, there broke out a violent dyſentery, of which ſixteen men died. This is agreeable to what Dr. Lind obſerves, that the flux may be brought on by a ſudden tranſition, either from cold to heat, or from heat to cold. All the men that were ill of this diſeaſe having been ſent to the hoſpital at Barbadoes, and the uſual attention to cleanlineſs having been kept up, the diſeaſe entirely diſappeared.

All the other ſhips of the American ſtation had been more or leſs viſited with ſickneſs after they left England, except the Bedford. This was probably owing to this ſhip having been longer in commiſſion than any of the others, that is, for four years, and all that time under the ſame commander. This laſt circumſtance falls to the lot of few ſhips; but a great advantage attends it; for the mutual

mutual knowledge and attachment of the captain and ſhip's company is naturally productive of regularity and good diſcipline, and thereby of health; and it is farther conducive to the ſame end, that there is no occaſion for the introduction of ſtrangers.

The Royal Oak, Prudent, and America, which left England with the Bedford, though they had been afflicted with the ſcurvy and other complaints ſoon after arriving in America had been quite healthy for ſome time before coming to the Weſt Indies, and were ſo much ſo at this period, that, though there were a few ſores and ſlight complaints on their ſick liſts, there was not a man ſo ill as to be confined to bed. The Royal Oak, having been the flag ſhip of Admiral Arbuthnot, was manned with choice ſeamen, which is a circumſtance generally conducive to health; for theſe being accuſtomed to a ſea life, are more provident, more handy and methodical in all that relates to diet, cloathing, and cleanlineſs. The ſcurvy, which infeſted her upon firſt arriving in America, was ſucceſsfully treated on board by ſerving to thoſe who were ill of it a meſs, compoſed of ſoft bread,

baked

baked on purpoſe, and mixed with wine and eſſence of malt.

The Prudent, though now quite healthy, had been ſickly ſoon after being put into commiſſion in Europe, and upon firſt arriving in America. She had been uncommonly ſickly, when a new ſhip, upon her firſt voyage, which was to the Eaſt Indies, during the peace. This remarkable degree of ſickneſs was probably owing to a particular experiment that was made in preparing the wood of which ſhe was built. This experiment conſiſted in ſoaking the timber for a length of time in a ſtrong pickle, in order to make it leſs corruptible. The only other ſhip on which the trial of this was made was the Intrepid; and it has been already mentioned that this was an extremely ſickly ſhip. The effect of it upon the wood was to cauſe a conſtant moiſture and mouldineſs in the orlops and holds. In the Intrepid, the ſickneſs was never conquered till a practice was followed of pumping and bailing her with great care, and putting a fire into the well for ſix hours every day, by which means the dampneſs, and the mildew produced by it, were removed and prevented

prevented, and the ſhip thereby rendered healthy.

The two ſquadrons being united, and conſiſting of thirty-four ſhips of the line, proceeded to St. Lucia, where they arrived on the 1ſt of March.

I received monthly returns as formerly, and the form of them was improved by adding a column for the numbers taken ill of the ſeveral diſeaſes in the courſe of the month. The returns of February are not complete, there being none for the 1ſt of that month, as we had not then arrived; but as the returns of the 1ſt of March have relation to the preceding month, a judgement may be formed of the ſickneſs and mortality of February from the following table:

ABSTRACT

ABSTRACT OF the RETURNS of the 1ſt of March, 1782.

DISEASES.	Put on the Sick Liſt laſt Month.	Died laſt Month.	Sent to the Hoſpital laſt Month.
Fevers - - -	553	15	9
Fluxes - - -	263	67	0
Scurvy - - -	121	2	5
Other Complaints	618	25	59
Total - - -	1,555	109	73

This account is abſtracted from the returns of twenty-nine ſhips of the line, and two frigates.

The diſeaſes and deaths under the head of "Other Complaints," is much more numerous in this month than uſual, which is chiefly owing to the preceding actions with the enemy, and to the prevalence of the ſmall pox. Of the deaths under this head, ſeventeen were in conſequence of wounds, ſix

ſix from ſmall pox, one from a mortification * in the ſhoulder, and one from conſumption.

None of the epidemics affected one part of the ſquadron more than another, except that the ſhips laſt from England had a leſs proportion of the flux than the reſt; and the few caſes of this diſeaſe that were in theſe ſhips aroſe after their arrival in the climate. The Conqueror and Fame, which were the two moſt ſickly ſhips, had no complaints but fevers.

The fevers had now begun to take on ſome of the characteriſtic ſymptoms of the climate; the chief of which is a greater abundance of bile. In the Repulſe, two men had the yellow colour of the ſkin, which is ſo peculiar to the fevers of this climate.

* The mortification in the ſhoulder, mentioned above, was ſomewhat ſingular. It happened to a man in the Yarmouth, who, after being for a week ill of a fever and flux, was one day, early in the morning, ſeized with a pain in the upper part of the right arm, which immediately began to mortify. He ſoon after became convulſed, and died the ſame day about two o'clock.

The

The crew of the Anſon caught an infectious fever from a guardſhip in England; and when the Prothée ſailed, there was a fever of the ſame kind on board; but from the change of climate, the ſymptoms became milder, and the diſeaſe diſappeared in both theſe ſhips in the courſe of this month.

The ſmall pox prevailed more at this time in the fleet than I have ever known it to do either before or ſince, and that both in the ſquadron from England and in that from North America. There were ſix caſes in the Formidable, all of which did well, though two were of the confluent kind.

Though there needs hardly any additional proof of the extraordinary efficacy of lemon juice in curing the ſcurvy, yet it may be of ſervice to impreſs ſo uſeful a truth on the mind by mentioning ſuch ſtriking proofs of it as occurred from time to time. The Arrogant ſpoke with a Portugueſe veſſel near Madeira, from which ſome of this fruit was procured, and the only ſcorbutic man on board happening to have ſome of the moſt deſperate

desperate symptoms, such as putrid gums, contracted hams, the calves of the leg hard and livid, and frequent faintings, a fair opportunity offered for trying its virtues. This man was allowed two of them daily, and was perfectly well in sixteen days, during all which time the ship was at sea, so that it was impossible to ascribe the cure to any other cause.

The fleet remained at St. Lucia from the 1st till the 18th of March, completing the water, provisions and stores, landing the sick at the hospital, and also watching the motions of the enemy, who arrived about the same time at Martinico from the siege of St. Christopher's. During this time we were reinforced with the Duke, of 90 guns, and the Warrior and Valiant, of 74 guns, from England. On the 18th the whole fleet, except the Invincible, which was detached with a convoy to Jamaica, sailed on a cruise to windward of Martinico, in quest of a French convoy expected from Europe; which having eluded us, and got into their own harbour, the whole fleet returned to St. Lucia on the 30th of March, excepting the Prudent, which was sent to Barbadoes.

We found at St. Lucia the Magnificent, of 74, and the Agamemnon, of 64 guns, which were the laſt reinforcement of this campaign, making the Britiſh fleet on this ſtation amount to forty ſhips of the line, a much greater force than was ever before employed on foreign ſervice. They were all ſheathed with copper.

The weather continued fine all this month, yet there was ſome increaſe of ſickneſs, owing chiefly to the hardſhip the men underwent in wooding and watering. In Choc Bay, where the fleet watered, there was at this time a higher ſurf than was ever remembered, which made the operation of watering (at all times noxious in this climate) uncommonly toilſome and dangerous. It was, indeed, next to impracticable; for many longboats were ſtaved on the beach, by which ſeveral men had their limbs broken, and ſome loſt their lives, by being cruſhed or drowned; but the neceſſity of the ſervice admitted of no relaxation or delay. There was no increaſe of wind to account for the ſurf, ſo that it was owing either to ſomething in the currents, to high winds to windward, or to ſome ſubterraneous

neous cauſe. There had been felt at Barbadoes and St. Lucia, about this time, a ſlight ſhock of an earthquake *, to which many imputed this extraordinary ſurf. In other

* Earthquakes are frequent in the Weſt Indies, and perhaps proceed from a weaker operation of the ſame cauſe that originally produced the iſlands themſelves, which ſeem all to have been raiſed from the ſea by ſubterraneous fire. There are evident veſtiges of volcanoes in them all, except Barbadoes; but there are other unequivocal marks of this iſland having been raiſed from the bottom of the ſea; for it is entirely formed of coral, and other ſub-marine productions, of which the ſtrata are broken, and the parts ſet at angles to each other, as might be expected from ſuch a cauſe. There is, perhaps, at all times more or leſs † ignited ſubſtances in the caverns of the earth, converting water into elaſtic vapour, which, ſtruggling to vent itſelf, may ſometimes ſhake or even overcome the incumbent maſſes of matter, and produce earthquakes and volcanic eruptions. In the account of the hurricane which I wrote to Dr. Hunter, I gave reaſons for believing, from the teſtimony of the inhabitants, that hurricanes are attended with earthquakes; and if a conjecture might be advanced concerning the cauſe of this, it might be ſaid, that as the atmoſphere is lighter at that time, by ſeveral inches of the barometer, the elaſtic vapour, confined by the weight of the incumbent earth and atmoſphere, being leſs compreſſed, may exert ſome ſenſible effects, producing a ſort of exploſion.

† See an ingenious Eſſay on this ſubject, by the Rev. Mr. Mitchell.—Phil. Tranſ. Vol. I.

reſpects, there were fewer cauſes of ſickneſs than uſually occur to a fleet in port in this part of the world; for the air of the road is remarkably pure, and there were fewer temptations and opportunities of intemperance than at the other iſlands.

The monthly returns of the ſurgeons were very full and complete; but as it would be tedious to inſert at length thoſe of every particular ſhip, and as the number of ſhips fluctuated in different months, I ſhall do no more hereafter than ſet down the general reſults from calculation, ſo as to ſhew the proportional prevalence of diſeaſe and mortality in each month.

TABLE, ſhewing the proportional Sickneſs and Mortality in March.

DISEASES.	Proportion of thoſe taken ill in the Courſe of this Month.	Proportion of thoſe who died, in relation to the Numbers of the Sick.
Fevers - - -	ONE IN 20	ONE IN 64
Fluxes - - -	35	71
Scurvy - - -	126	0
Other Complaints	33	108
General Proportion	9	76

The firſt column is formed by dividing the whole number on board by the number taken ill. The ſecond column is formed by firſt adding the number ill on board on the firſt of the month to the number taken ill during the month, ſubtracting from this ſum the number ſent to the hoſpital, and dividing the remainder by the number of deaths.

The number on the ſick liſt of twenty-eight ſhips of the line, and two frigates, on the firſt of this month, was eight hundred and forty-five; the number put on the liſts in the courſe of the month was one thouſand eight hundred and eighty-four; and the number ſent to the hoſpital in the ſame time was three hundred and ſeventy-three; and there died on board thirty-one.

The total mortality this month, in relation to the whole number of men on board, was one in ſix hundred and ſeven.

It almoſt always happens, that ſhips of war are more or leſs ſhort of complement, but all the calculations are made by the exact numbers on board; for having had an opportunity of inſpecting the weekly accounts delivered to the Admiral, it was always in my power to be informed how many there were ſhort of the legal complement of men in each ſhip.

It appears, from comparing the Tables of this month with thoſe of the preceding, that there had been a great increaſe of fevers and fluxes, particularly of the latter. The fevers prevailed chiefly in the ſhips

lately from England, eſpecially the Fame and Conqueror. In the Duke there was a great number ill of fevers; but this ſhip not having arrived from England till after the firſt of the month, is not included in the calculation. The fluxes were moſt prevalent in the ſhips we found on the ſtation, particularly the Canada, Reſolution, and Nymph frigate. The ſcurvy had increaſed very little, but prevailed moſt in the ſhips we found here. The only ſhips of the new ſquadron that had this diſeaſe to a conſiderable degree, were the Conqueror and Nonſuch. The former had indeed a good many ill of it; but the return having been made in an imperfect manner, this ſhip is not included in the calculation.

But the ſhips that were by far the moſt healthy were thoſe that had been the longeſt from England, the Ajax, Ruſſel, Montague, Royal Oak, and Prudent. There had been formerly a great mortality in all theſe ſhips; and it would appear that this uncommon degree of health was owing, in ſome meaſure at leaſt, to this circumſtance, that the more delicate had been ſwept off by the different diſtempers to which they were

expoſed; ſo that only the more hardy and robuſt had ſurvived.

Under the head of "Other Complaints," a much ſmaller number were put on the liſt, and ſtill fewer died in this than the preceding month. This difference is owing to the number that died of wounds laſt month.

There died on board, in the courſe of this month, thirteen of fevers, ſeven of fluxes, and ſeven of other complaints, of whom five died of ſmall-pox, one of aſthma, and one of wounds he received at St. Chriſtopher's.

In order to ſhow more fully and minutely what are the complaints incident to fleets in this climate, I ſhall ſet down a liſt of the numbers taken ill of the different diſeaſes and accidents during this month, extracted from the returns of twenty-eight ſhips of the line and two frigates.

Fevers	806	Dropsy	1
Fluxes	463	Ophthalmia	1
Scurvy	130	Leprosy	1
Ulcers	129	Fistula in ano	3
Small-pox	49	Hernia humoralis	1
Rheumatism	18	Abscess	1
Pectoral complaints	40	Fractures	3
Venereal complaints	32	Various slight accidents, as bruises, cuts, scalds, &c.	163
Colds	30		
Angina	10		
Gravel	3	Total	1,884

The number of ulcers bears here a smaller proportion than it does in general to the sum total of the sick list; for being the most tedious of all complaints, they consequently accumulate more than any other. Thus many of the cases now set down as slight accidents, will, in the ensuing month, be in the state of obstinate ulcers.

Most of the diseases of one hot climate resemble those of another, so far as I know; but there is one disease which we hear of as being extremely prevalent all over the East Indies, which is hardly ever met with in the tropical regions of the West. This is

the inflammation of the liver, of which I remember to have ſeen only one well-marked caſe, and it was that of a gentleman who had been in the Eaſt Indies, and had been ſubject to it there: nor do I recollect more than one, or at moſt two, caſes of this ſort out of ſeveral thouſand caſes of various diſeaſes that were reported to me. This is either owing to the greater heat and dryneſs of the air in the Eaſt Indies, or ſome other peculiarity with which we are not acquainted *

Every other inflammatory complaint exiſts more or leſs, though they are much rarer than

* Since the publication of the firſt edition of this work, I have been informed that this complaint is not ſo rare on ſhore as in the fleet; which may be partly owing to the greater coolneſs of the air at ſea, and partly from the ſeamen not having been a ſufficient length of time in the climate to be affected with this diſeaſe, as few of them had been more than two years from England. But as this affection of the liver was very common in the fleets and naval hoſpitals in the Eaſt Indies, it is evident that it differs materially in this reſpect from the tropical countries of the Weſt. It is worth remarking, that it ſometimes breaks out in the Weſt-India Iſlands like an epidemic. The complaint, for inſtance, was very little known in the iſland of Grenada, till about the year 1785, when

than in cold and temperate climates. The phthiſis pulmonalis is not ſo common as in cold climates, but proves ſooner fatal to moſt conſtitutions. There are certain pulmonic complaints, particularly thoſe of the aſthmatic kind, to which the climate of the Weſt Indies is remarkably favourable; but thoſe in which there are tubercles and ulceration, ſeem to be hurried faſter to a fatal termination. The climates, from the thirtieth to the fortieth degree of latitude, ſeem to be beſt ſuited to conſumptive complaints. The rheumatiſms that occur in hot climates are moſtly of the chronic kind.

when it became very frequent in a particular quarter of the iſland; and the gentleman who ſent the deſcription of it to England alledged, that there were the moſt unequivocal proofs of its been contagious. It was moſt ſucceſsfully treated by very copious bloodletting, and in exciting a ſalivation by mercury. See Dr. Duncan's Medical Commentaries, Decad. 2, vol. I.

CHAP. III.

THIS month being intereſting, on account of the memorable engagements that happened in it, the remarks ſhall, for this reaſon, be ſomewhat more full and particular.

Three ſhips of the line having been ſent to protect convoys to Jamaica, and one having been ſent to protect a convoy to Barbadoes, there remained thirty-ſix at St. Lucia in the beginning of this month. By the end of the firſt week their damages were repaired, their water and proviſions complete, and the ſick in a great meaſure recovered.

An equal force of the enemy lay over againſt us at Martinico, the two powers of Britain and France being to make this diſtant quarter of the world the theatre for trying their ſtrength, and deciding the ſovereignty of the ſeas. In the view of this great event, our commander forwarded the neceſſary duties of the fleet with ſuch zeal and diligence, and watched the motions of the enemy with ſuch

TABLE V.

ABSTRACT of the RETURNS for APRIL, 1782.

SHIPS' NAMES.	FEVER.				FLUX.				SCURVY.				WOUNDS.			
	Sick on board on the 1st of the Month.	Put on the List during the Month.	Dead.	Sent to the Hospital.	On board on the first.	Put on the List.	Dead.	Sent to the Hospital.	On board on the first.	Put on the List.	Dead.	Sent to the Hospital.	On board on the first	Put on the List.	Dead.	Sent to the Hospital.
* Formidable	0	6	0	1	2	7	0	0	0	5	0	0	0	37	0	0
Barfleur	6	20	0	1	5	13	0	1	6	30	0	1	0	37	8	6
Prince George	0	12	2	1	4	18	1	0	0	7	0	0	0	4	3	0
* Duke	57	78	2	32	0	3	0	0	0	1	0	0	0	60	2	0
* Namur	5	14	0	2	11	9	0	3	8	5	0	2	0	25	0	0
Royal Oak	1	4	0	0	11	23	0	3	1	1	0	1	0	54	5	15
Alfred	8	46	1	0	6	14	0	0	15	14	0	2	0	30	0	0
Montagu	6	11	0	0	8	2	1	5	2	2	0	0	0	25	5	0
* Valiant	§	10	1	0	§	0	0	0	§	0	0	0	0	37	0	0
Monarch	5	21	1	0	3	10	0	1	0	1	0	1	0	33	2	1
* Warrior	0	2	0	0	6	12	0	0	0	0	0	0	0	20	0	0
Centaur	12	20	0	1	10	15	0	1	5	15	0	0	0	14	0	0
* Magnificent	0	21	0	0	0	8	0	0	7	16	0	0	0	20	0	0
Bedford	11	20	0	0	3	27	0	0	1	10	0	0	0	17	4	0
Ajax	0	0	0	0	0	0	0	0	0	0	0	0	0	30	1	5
Canada	0	6	1	6	24	70	2	0	2	8	0	0	1	12	0	0
Refolution	19	25	1	0	21	27	0	0	0	0	0	0	0	19	2	0
* Hercules	2	38	0	4	5	18	0	0	0	12	0	2	0	18	0	0
Ruffel	3	3	0	0	5	4	0	0	0	1	0	0	4	29	3	1
* Fame	36	50	0	0	3	8	1	0	0	7	2	0	1	12	2	0
Torbay	10	10	0	0	9	2	0	0	3	2	0	0	0	25	3	0
Princeffa	1	2	0	0	2	8	0	3	0	0	0	0	0	19	2	0
* Conqueror	30	§	1	11	0	§	0	0	10	§	0	0	0	23	2	0
* Arrogant	2	16	0	0	6	33	0	0	4	10	0	0	0	11	0	0
* Marlborough	7	19	2	0	12	21	1	0	0	6	0	0	0	16	1	1
* Yarmouth	0	3	0	0	4	3	0	0	3	3	0	0	0	33	2	0
Belliqueux	43	118	0	0	6	4	0	2	0	3	0	0	0	10	0	0
Prince William	4	27	0	0	2	24	0	0	5	18	0	0	1	0	0	0
* Repulfe	20	40	0	0	2	2	0	0	3	2	0	0	0	9	1	0
St. Albans	1	22	0	0	0	6	1	0	0	0	0	0	0	7	1	0
* Agamemnon	2	5	0	0	0	1	0	0	0	0	0	0	0	23	7	0
* Prothée	6	13	1	0	5	49	0	0	0	0	0	0	0	24	2	0
America	2	5	0	0	3	14	0	0	2	0	0	0	1	27	2	0
* Anfon	3	6	0	0	0	26	0	0	1	1	0	0	0	13	0	0
* Nonfuch	6	11	1	0	0	4	0	0	18	25	0	6	0	2	0	0
Alcide	2	6	0	2	7	16	0	0	7	0	0	0	0	15	0	3
Ramillies	§	26	1	4	§	6	0	0	§	3	0	3				
Nymph	2	7	0	0	8	9	0	0	0	0	0	0	0	0	0	0
Flora	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0
Total	312	743	15	65	195	516	7	19	103	208	2	18	8	810	60	32

N. B. The Ships marked thus, * came from England in February and March, 1782.

All the Ships named in the Table were in the Engagements in April, except the Ramillies and the two Frigates.

In the Spaces marked thus, §, no Return was made.

ſuch vigilance, that he overtook their grand ſquadron a few hours after they left their own port, and engaged them two ſeveral days, with a ſucceſs, glorious and complete.

Nothing had been wanting to equip this fleet for the great and deciſive exertion it was to make. Every ſhip, except two, might be ſaid to be healthy, moſt of them were complete in men, well appointed with officers, and well found in ſtores and proviſions.—Conformable to this was the eagerneſs, the confidence, and reſolution, which led them to ſucceſs and victory.

After this battle, the whole fleet, with the prizes, bore away for Jamaica, where part of it arrived on the laſt days of April, but the greater part of it kept the ſea till after the middle of May.

As this month is more than uſually intereſting, the tables are given at full length, and a column is added for the wounded.

The ſum total, of the numbers of the men on board of the thirty-ſix ſhips that compoſed the line of battle on the 12th of April, was

was 21,608, and the mortality during the month, excluſive of thoſe who were killed or died of wounds, was one in 862.

There was leſs ſickneſs, and leſs death, from diſeaſe in this month, than any of the former twenty-three months, in which I kept records of the fleet, and leſs than in any ſubſequent month, till the fleet got to the coaſt of America.

To account for this, it is to be obſerved, that the men had not been expoſed to the noxious air of the ſhore in watering, as in the preceding month: they had received from England a freſh ſupply of proviſions, among which was ſour krout, melaſſes, and eſſence of malt, all in addition to the ordinary articles of victualling: many of the ſhips were ſupplied with wine in place of rum, and as the weather was all along dry and fine, the men ſuffered the leſs from the expoſure and want of ſleep, which are the neceſſary conſequences of keeping ſhips clear for battle for ſeveral days and nights together.

Might

Might not this extraordinary degree of health have alſo been owing, in part, to the effects of ſucceſs upon the ſpirits of the men? It is related *, that, when the fleet under Admiral Matthews was off Toulon, in daily expectation for ſome time of engaging the combined fleet of France and Spain, there was a general ſtop put to the progreſs of diſeaſe, particularly of the ſcurvy, from the influence of that generous flow of ſpirits, with which the proſpect of battle inſpires Britiſh ſeamen. But if the mere expectation and ardour of a battle, without any happy event, could have ſuch a ſenſible effect, what muſt have been the effect of the exultation of VICTORY, a victory in which the naval glory of our country was revived and retrieved, after a ſeries of misfortunes and diſgraces, which had well nigh extinguiſhed the national pride in every department of ſervice! The plain and honeſt, though unthinking ſeaman, is not leſs affected by this than the more enlightened lover of his country. Even the invalids at the hoſpital demonſtrated their joy, upon hearing of this victory, by hoiſting ſhreds of coloured cloth on their crutches.

* Dr. Lind, on the authority of Mr. Ives, ſurgeon to Admiral Matthews.

It

It would appear, that there is ſomething in ſituations of exertion and danger, which infuſes a ſort of * præternatural vigour. When the mind is intereſted and agitated by active and generous affections, the body forgets its wants and feelings, and is capable of a degree of labour and exertion, which it could not undergo in cold blood. The quantity of muſcular action employed in fighting at a great gun for a few hours, is perhaps more than what is commonly employed in a week in the ordinary courſe of life, and though performed in the midſt of heat and ſmoke, and generally with the want of food and drink, yet the powers of nature are not exhauſted nor overſtrained; even the ſmart

* What is here called *præternatural*, may have been taken for *ſupernatural* by unenlightened minds and heated imaginations, and when we reflect on the real encreaſe of natural ſtrength produced by ardour of mind, we can excuſe that ſuperſtitious illuſion which attributes it to the ſecret agency of ſome propitious inviſible power. This ſentiment, which ſo ſtrongly influences the human character and conduct, is plainly implied in the etymology of the word *enthuſiaſm*; and the conſciouſneſs of this encreaſed vigour of mind and body, exalted by the belief of its divine origin, will ſerve to account for the aſtoniſhing efforts of this principle which are met with in the hiſtory of mankind, and which have effected ends unattainable by ordinary motives of action.

of

of wounds is not felt; and the future health of thoſe who ſurvive unhurt by external violence is ſo far from being injured, that it is ſometimes mended by this violent, but ſalutary agitation.

The loſs in action, and the number of mortal wounds, were not ſo great as might have been expected in a battle continued for a whole day. This advantage was owing to the ſuperiority of our fire, as well as to the cloſeneſs of the fight, of which the Commander in Chief ſet the illuſtrious example, by penetrating the enemy's line with his own ſhip; a bold and ſingular effort which firſt decided the event of the day. When ſhips in action are oppoſed to each other at a ſmall diſtance, the velocity of cannon balls is ſo great, that in penetrating a ſhip's ſide, few or no ſplinters are torn off; and by theſe more men are commonly killed and wounded, than by the ball itſelf. For the ſame reaſon, a cloſe ſhot does leſs damage alſo to the ſhip itſelf, than a diſtant one; for a quick-flying ball makes an aperture leſs than its own diameter, whereas a ſpent one produces innumerable deadly ſplinters, at the ſame time ſhivering the object

ject it ſtrikes, and making wide and extenſive rents in it. The proportion of the wounded to the killed, is alſo greater in diſtant than in cloſe fight, on account of the great number of ſmall ſplinters; and we have an experimental proof of this, in comparing the action in Fort Royal Bay in April 1781, with this near Dominica in April 1782. In the former, the enemy having kept far to windward, and engaged at a great diſtance, the proportion of the wounded to the killed was conſiderably more than four to one*; whereas in the latter, where the greater part of the battle was cloſe, the proportion of the wounded to the killed, was little more than three to one †.

* London Gazette, *June*, 1781.

† This is well illuſtrated by the manner in which Captain Nott, of the Centaur, was killed in Fort Royal Bay. This brave man, having carried his ſhip nearer the enemy than the reſt of the line, but nevertheleſs at a great diſtance, had his ſignal made to keep the line, and having gone into his cabin, as it is ſaid, to examine the import of the ſignal, a cannon ball ſtruck him in the groin, and it was ſo far ſpent that it ſtuck in his body. It tore away a whole plank of the ſhip's ſide, the ſplinters of which killed a young gentleman, the only perſon near him.

Though

Though it is a remark not belonging to a medical work, yet it may be obſerved, that the greateſt advantage that aroſe to us from cloſe action was, that the fire of the enemy was thereby ſilenced; for the advantages would be mutual and equal, on the ſuppoſition, that the French, in ſuch a ſituation, were to keep the deck, and ſtand to their guns equally well with the Britiſh ſeamen.

It appears, by examining the table, that the ſhips in which the fevers chiefly prevailed this month, were thoſe that came laſt from England, and that thoſe in which the fluxes prevailed moſt were chiefly of the ſquadron we found on the ſtation, namely, the Canada, Reſolution, and Prince William. The latter however recovered greatly in the courſe of this month. Some of the Ships that arrived laſt from England, namely, the Arrogant, Prothée, and Anſon, were alſo conſiderably afflicted with fluxes, but they were of an extremely mild kind; and the ſmall number of deaths from this diſeaſe in compariſon with thoſe from fevers, is a proof of a former obſervation, that this is the ſafeſt form in which an acute diſeaſe can ſhew itſelf. This ſmall degree of mortality was alſo owing to

the judicious method of treating it which was in general practiſed throughout the fleet; and it is but juſtice to the medical gentlemen to ſay, that they ſhewed on this, as well as every other occaſion, great ſkill and attention in the treatment of the ſick and wounded.

The ſum total of fevers and fluxes that have been put on the liſt this month, is much the ſame as that of the preceding month; but the proportion of fluxes in April is much greater.

The proportion of ſcurvy is ſomewhat increaſed; which is not to be wondered at, when it is conſidered, that though the fleet had not been ſo long at ſea as is neceſſary to produce it, eſpecially in this climate, yet the men having had no refreſhments when laſt in port, may be conſidered as having been all that time at ſea.

The ſuperior degree of health in this month will appear in a ſtill ſtronger light, if we caſt our eye on the column expreſſing the number ſent to the hoſpital, the proportion of which is, comparatively, very ſmall.

The

The ſhips that had been the longeſt from England, were ſtill among the moſt healthy. But of all the fleet, none was ſo free from ſickneſs and mortality as the Formidable. No man belonging to this ſhip died of diſeaſe for the firſt four months after ſailing from Plymouth, though there were at times 900 men on board, and never leſs than the eſtabliſhed complement, which is 750; and ſo few were taken ſick in that time, that only thirteen were ſent to hoſpitals, and their complaints were ſmall-pox and ulcers.

This ſhip left England provided with every thing that could be ſuppoſed to conduce to the health of men, and may be conſidered as an experiment to prove what degree of health may be attained by proper management and attention. She was furniſhed not only with abundance of ſour krout, melaſſes, and eſſence of malt, in common with the other ſhips; but what was peculiar to her, was an entire ſupply of excellent wine, in place of ſpirits, of which none was uſed during the period mentioned.

CHAP. IV.

ALL the ſquadron that was left to windward of Jamaica, conſiſting of twenty-four ſhips of the line, kept the ſea during great part of May, the laſt diviſion of it not having come to Port Royal till the 25th of that month.

The whole fleet remained in harbour during the remainder of the month, and the whole of the next, except the Warrior, Prothée, and Ruſſell. The two former were ſent on a cruiſe, in which the Warrior continued quite healthy, as ſhe had been ever ſince her arrival from England; and in the Prothée a great check was given to the fevers and fluxes which had begun to prevail at Port Royal. The Ruſſell was ſent to England with a convoy.

TABLE, ſhewing the proportional Prevalence of Sickneſs and Mortality in May.

DISEASES.	Proportion of thoſe taken ill or wounded in the Courſe of the Month.		Proportion of thoſe that died in relation to the Numbers of Sick or wounded.	
Fevers - - - - -	ONE IN	26	ONE IN	29
Fluxes - - - - -		18		63
Scurvy - - - - -		57		34
Wounds - - - -		627		60
Other Complaints - -		44		127
General Proportion, including wounded		$7\frac{1}{2}$		46
General Proportion, excluſive of Wounds		8		48

The whole number of ſick on board on the firſt of this month, in thirty-ſix ſhips of the line and two frigates, upon which the preceding calculation is formed, was one thouſand four hundred and eighteen. The

whole number taken ill in the courſe of the month was two thouſand eight hundred and twenty-eight; the number ſent to the hoſpital was one hundred and ſeventy-three; and there died on board ninety-four.

The proportion of thoſe who died this month, in relation to the whole number on board, was one in two hundred and eighty-ſeven.

There was a conſiderable increaſe of ſickneſs and mortality this month in all the common diſeaſes, and chiefly in that part of the ſquadron which was in port. There was leſs increaſe in the number of fevers than either of the other two epidemics; but ſuch was their increaſed malignancy, that more died of them than of both the others. The number of fluxes was more than double of what it was the preceding month, and the mortality from them was alſo in a much greater proportion, as may be ſeen from the Tables.

The fevers prevailed chiefly in port, and the fluxes at ſea. A good many of the latter, indeed, aroſe in the Alcide, though conſtantly

conſtantly in port; but this ſeemed to be owing to contagion conveyed by ſome Britiſh ſoldiers, who were ſent on board of this ſhip after being retaken in one of the French men of war, ſeveral of whom were ill of this diſeaſe. But there were few fluxes in thoſe ſhips at Jamaica in which the moſt malignant fevers appeared. There were a few in thoſe in which the fevers aroſe from the air of the marſhes on the watering duty; but there were none on board of the French prizes, nor in thoſe ſhips in which that ſort of fever was which proceeded from a ſimilar cauſe, that is, filth and animal effluvia. Upon the whole, in thoſe ſhips in which the fever was moſt malignant, there the feweſt fluxes were found.

Several circumſtances contributed to the increaſe of ſickneſs and mortality this month.

1ſt. The infection, or rather the foul air, of the French prizes, in moſt of which a very bad fever broke out among the officers and men that were ſent from the ſhips of our fleet to take charge of them.

The diſcipline and internal œconomy of the French ſhips of war are greatly inferior to thoſe of the Britiſh. Their decks are never waſhed, and there is a great defect in every point of cleanlineſs and order. The free courſe of the air is obſtructed by lumber of every kind, and by bulkheads, which are not taken down even in the time of battle; and the gratings are covered night and day with tarpaulins, even in a hot climate. There are not even ſcuppers opened on the lower deck as outlets to the water and filth, which neceſſarily accumulate there, and for which the only vent is a pipe contrived on purpoſe, paſſing from that deck along the ſhip's ſide into the hold, which becomes thereby a common ſink, inconceivably putrid and offenſive. And in addition to the ordinary cauſes of corruption, there was one peculiar to the occaſion; for the blood, the mangled limbs, and even whole bodies of men, were caſt into the orlop, or hold, and lay there putrifying for ſome time. The common ſailors among the French have a ſuperſtitious averſion to the throwing of bodies overboard immediately after they are killed, the friends of the deceaſed wiſhing to reſerve their remains, in order to perform a religious

a religious ceremony over them when the hurry and danger of the day ſhall be over. When, therefore, the ballaſt, or other contents of the holds of theſe ſhips, came to be ſtirred, and the putrid effluvia thereby let looſe, there was then a viſible increaſe of ſickneſs. For the firſt three weeks after the capture of theſe ſhips, the ſtench proceeding from the numbers of wounded men contributed alſo to taint the air.

The Ville de Paris was much more ſickly than the other prizes, not only from her being larger, and thereby containing a greater maſs of foul air, but by receiving the ſurviving part of the crew of the Santa Monica, one of our frigates, which had been caſt away on the Virgin Iſlands, and whoſe men were ſo reduced by hardſhip and intemperance, that moſt of them were taken ill as ſoon as they came to breathe the unwholeſome air of the French prize. To whatever cauſe it was owing, the fever was much more violent here than in the other prizes, and it generally carried men off on the third or fourth day; and what is remarkable, the officers were affected by it in a greater proportion than the common men. One lieutenant,

tenant, and every warrant officer, except the boatſwain, died of it. This was a proof that the ſickneſs was owing to the bad air, and not to the intemperance and irregularity ſo uſual on board of prizes, which only the common men give into; and the probable cauſe of the officers being moſt affected is, that they were accuſtomed in common to a purer air, by living in the moſt clean and airy parts of the ſhip.

It is alſo remarkable, that the Ville de Paris was healthy when taken, and had been ſo ever ſince leaving France in March 1781; nor had any other of the captured ſhips of the line been ſickly for ſome time before, except the Ardent, when ſhe arrived at Martinico, four months before, at which time the greater part of the crew were ſent to the hoſpital with fevers. This, as well as other facts of the ſame kind, tends to prove, that when men come to be much habituated to bad air, their health is not affected by it.

The French ſhips were purified by waſhing and ſcraping, by fumigating daily with gunpowder and vinegar, and by the uſe of wind ſails; but nothing ſeemed to contribute ſo much

much to ſweeten the air in them as burning fires in the hold; for this tended both to make the putrid matter exhale, and to carry it off, by producing a perpetual change of air. Captain Curgenven, who at this time commanded the Ville de Paris, had great merit from his very aſſiduous and ſucceſsful endeavours in ſo difficult a duty as the management and equipment of this great ſhip. In conſequence of the judicious meaſures taken, and the men becoming more uſed to the bad air, the ſickneſs ceaſed in the courſe of a few weeks.

In the accounts given in the tables, the French prizes are not included, for the diſorderly ſtate in which they were at this time prevented my receiving regular returns; but having made inquiry concerning the mortality in the Ville de Paris, I found, that of a crew of three hundred and twelve men, there died ten in the month of May, and that thirty had been ſent to the hoſpital, whoſe caſes were ſo unfavourable, that about one half died. The only diſeaſes were fevers. The ſurgeon of the Ardent told me about the ſame time, that one third of the crew of that ſhip was ill of fevers.

The

The ſecond cauſe of the prevalence of ſickneſs, while the fleet was at Jamaica, was, the watering duty, which was carried on at Rock-fort, about three leagues from Port Royal. It was the practice of many of the ſhips to leave the water caſks on ſhore all night, with men to watch them; and as there is a land wind in the night, which blows over ſome ponds and marſhes, there were hardly any of the men employed on that duty who were not ſeized with a fever of a very bad ſort, of which a great many died. The ſhips that followed a different practice were ſomewhat longer in watering; but this was much more than compenſated by their preſerving the health and ſaving the lives of their men.

The land wind which blows on the ſhore in the night time, is a circumſtance in which Jamaica differs from the ſmall iſlands to windward, over which the trade wind blows without any interruption: but though this land wind blows upon Port Royal from ſome marſhes at a few miles diſtance, it does not ſeem to produce ſickneſs, for it is a very healthy place, and ſeveral of the ſhips enjoyed as good health as in the beſt ſituations

on

on the windward ſtation. The bay which forms this harbour is bounded towards the ſea by a peninſula of a ſingular form, being more than ten miles in length, and not a quarter of a mile broad at any part. Great part of it is ſwampy and overgrown with mangroves, and though of ſuch ſmall extent, we fancied that ſome of the ſhips that lay immediately to leeward of this part were more ſickly than thoſe that were cloſe to the town of Port Royal, which ſtands at the very extremity of this long peninſula, upon a dry, gravelly ſoil.

The weather this month was uniformly dry in port; but at ſea the air was moiſt and hazy. Between Jamaica and Hiſpaniola, where part of the ſquadron was left to cruiſe, dead calms prevailed; and this, joined to the moiſture of the air, was probably what cauſed the flux to prevail chiefly in this part of the fleet. At Port Royal, on the contrary, there was a ſtrong dry breeze, which ſet in every day about nine o'clock in the morning, and blew all day ſo freſh, that there was frequently danger in paſſing from one ſhip to another in boats. This is called, in the language of the country, the *fiery ſea-breeze*, an epithet which it ſeems to have got not ſo much from its abſolute heat, as from

from the ſenſation of heat which it cauſes by drying up the perſpiration. It was remarked, that this breeze was ſtronger this ſeaſon than had ever been remembered; and it ſometimes even blew all night, preventing the land breeze from taking its uſual courſe. This year was farther remarkable for the want of the rains that were wont to fall in the months of May and June. We ſhall have occaſion to remark hereafter, that this was a very uncommon ſeaſon alſo in Europe and America. The heat, by the thermometer, this month, on board of a ſhip at Port Royal, was, in general, when loweſt in the night, at 77°, and when higheſt in the day, in the ſhade, at 83°.

There was a conſiderable increaſe of ſcurvy in this month, compared with the former months of this campaign; but very inconſiderable, compared with what had occurred in cruiſes of the ſame length in former years. The laſt diviſion of the fleet had been at ſea ſeven weeks, all but one day, when it arrived at Port Royal; and though the ſcurvy had appeared in ſeveral of the ſhips, it did not prevail in any of them to a great degree, except in the Nonſuch. Out of fourteen deaths

deaths which happened in the whole fleet from this diſeaſe, in May, ſeven of them were in this ſhip, and ſeveral were ſent from her to the hoſpital in the laſt and moſt deſperate ſtage of it. But, upon the whole, the caſes of the true ſea ſcurvy in the fleet, in general, were few and ſlight, and a great many of thoſe given in the reports under the head of ſcurvy, were cutaneous eruptions or ulcers, not properly to be claſſed with it.

The cruiſe in the preceding year to windward of Martinico, may be compared with that in May of this year; for the fleet in both caſes had been at ſea about the ſame length of time. But the compariſon is very greatly in favour of the latter, which is moſt probably to be imputed to the plentiful ſupply of melaſſes, wine, ſour krout, and eſſence of malt. But no adequate reaſon that I could diſcover can be aſſigned for the prevalence of it in the Nonſuch to a degree ſo much more violent than in the other ſhips; and it was here farther remarkable, that it attacked every deſcription of men indiſcriminately; for I was aſſured by the officers and by the ſurgeon, that not only the helpleſs and diſpirited landſman was affected, but

old

old ſeamen, who had never before ſuffered from it on the longeſt cruiſes. I have been led by this, and ſome other facts, to ſuſpect that there may, in certain circumſtances, be ſomething contagious in this diſeaſe.

JUNE.

The greater part of the fleet remained at Jamaica during this month, refitting and watering. Twelve ſhips of the line were ſent to ſea on the 17th, under the command of Rear-admiral Drake, but not being able to get to windward on account of the freſh breezes that prevailed, they returned to Port Royal on the 28th. Such of theſe ſhips as were ſickly, became more healthy while at ſea; but ſome bad fevers aroſe, particularly in the Princeſſa; and it is a curious circumſtance, that theſe fevers attacked only thoſe men who had been on ſhore on the watering duty; from which it would appear, that ſomething caught or imbibed from the exhalations of the ſoil, which is the cauſe of the fever, lies dormant for ſome time in the habit, like the ſpecific morbid poiſons, ſome of the men not having been affected for more than a week after they had been at ſea.

The

The weather continued dry and windy, as in the former month; but the heat was in general about two degrees higher, the thermometer varying from 79° to 84½°.

TABLE, ſhewing the proportional Sickneſs and Mortality in June.

DISEASES.	Proportion of thoſe taken ill in the Courſe of this Month.	Proportion of thoſe who died, in relation to the Numbers of the Sick.
Fevers - - -	ONE IN 11	ONE IN 19
Fluxes - - -	ONE IN 20	ONE IN 83
Scurvy - - -	ONE IN 47	ONE IN 231
Other Complaints	ONE IN 37	ONE IN 97
General Proportion	ONE IN 6	ONE IN 39

The proportion of deaths in relation to the whole numbers on board, was one in one hundred and thirty-eight.

There was only one in thirty of the ſick ſent to the hoſpital in the courſe of this month.

There was an increaſe both in the numbers and fatality of fevers. This increaſe was chiefly in that ſort of fever which depends on the air and climate, the greater part of which was caught on the watering duty. There was a diminution of thoſe fevers depending on infection, and the foul air of ſhips, which aroſe in the French prizes. The care that was taken in purifying theſe ſhips was very effectual; for only four died this month in the Ville de Paris, and fewer alſo were ſent to the hoſpital than in May. The increaſe of the other kind of fever was chiefly owing to there being a greater number of ſhips in port, the crews of which were employed in watering, and partly, no doubt, to the increaſe of heat in the weather. The ſhips in which the fevers were moſt fatal were the Monarch, the Duke, the Torbay, and the Reſolution. The ſickneſs in the Duke was ſtill in a great meaſure owing to the ſame infection that had hitherto prevailed; for this ſhip had never been cleared of the infectious fever, for want of room at the hoſpital. That which broke out in the Torbay was alſo of the low infectious kind, few of them having the ſymptoms of that which is peculiar

liar to the climate, which prevailed in the other ſhips. This ſhip, though formerly very ſubject to infectious complaints, had been remarkably healthy for ſome time paſt; but it would appear that there was a large ſtock of latent infection, which ſhewed itſelf from time to time. The preſence of infection does not neceſſarily excite diſeaſe, a concurrence of other circumſtances being requiſite, as ſhall be more fully ſhewn hereafter.

Some ſhips, particularly the Montague and Royal Oak, had no increaſe of fevers or other complaints, though the one lay in port for ſeven, and the other for eleven weeks, and were more or leſs expoſed to the cauſes of ſickneſs which affected the reſt of the fleet. This is another proof, that a particular combination of cauſes is neceſſary to produce a diſeaſe, no ſingle one, however powerful, being ſufficient, without the concurrence of others. What ſeemed to be wanting here was the pre-diſpoſition requiſite for the admiſſion of diſeaſe into the conſtitution; for the ſhips that enjoyed this happy exemption were ſuch as had long-eſtabliſhed and well-regulated crews, accuſtomed to the ſervice and climate.

There had been this month a diminution both of the numbers and mortality of fluxes, which is agreeable to what was before remarked, that fevers were more apt than fluxes to prevail in the bad air of a harbour *. It was alſo before remarked, that there were few or no fluxes in thoſe ſhips in which the fever was moſt malignant; and now that the fever began to grow more mild in the French prizes, the flux began to appear. In the Barfleur, Duke, and Namur, both diſeaſes ſeemed to prevail equally; but the fevers, though numerous, were more of the low nervous kind than bilious or malignant; and the fluxes chiefly attacked thoſe who were recovering from fevers. We may farther remark, that theſe three men of war

* I have ſeen an account of the diſeaſes of the army at St. Lucia for a whole year, kept by Mr. Everard Home, an ingenious gentleman belonging to the army hoſpital, and it appears, that, during ten months out of the twelve, the dyſentery was the predominant diſeaſe. This ſeems to contradict the opinion, that the land air is more apt to occaſion fevers than fluxes; but it is to be remarked, that the ſickneſs of the ſoldiers on this iſland was not ſo much owing to the malignant influence of the air, the ſituation of the garriſon being high and airy, as to the bad accommodations and proviſions, together with hard labour.

were

were three-decked ſhips, of 90 guns, the crews of which being more numerous, and compoſed of a more mixed ſet of men, were conſequently ſubject to a greater chance of infection, and a greater variety of complaints. The Formidable ſtill remained healthy to an extraordinary degree. Some fevers were indeed imported from the Ville de Paris by men that had been lent to that ſhip, and who were taken ill after their return. Of theſe, a few of the worſt caſes were ſent to the hoſpital, and two died on board, who, with one that died the preceding month, make the whole loſs of this ſhip by death, ſince leaving England, amount only to three men.

There has been little or no increaſe of ſcurvy this month; for though the numbers put on the liſt appear to be greater, the mortality is much leſs. It may indeed appear a matter of ſurpriſe that there ſhould have been any ſcurvy at all, conſidering that the greater part of the fleet was at anchor all this month. But as this was the greateſt fleet that had ever viſited Jamaica, it was impoſſible to find freſh proviſions for the whole; ſo that the ſupply they had

did not amount to one freſh meal in a week. Port Royal is alſo remote from the cultivated part of the iſland, ſo that fruit and vegetables were both ſcarce and high priced, particularly this year, on account of the uſual rains in May and June having failed. There was, however, an allowance of freſh proviſions and vegetables made to the ſick by public bounty; for as the hoſpital could contain but a ſmall proportion of the ſick and wounded, an order was given for the ſupply of freſh meat, fruit, and vegetables, to the ſick, and five hundred pounds of Peruvian bark were alſo diſtributed as a public gratuity, beſides ſugar, coffee, and wine.

With theſe aids, and the various good articles of victualling from England, the fleet was preſerved uncommonly healthy for a Weſt-India campaign: for though the mortality had increaſed conſiderably during our ſtay at Jamaica, yet the loſs of men, upon the whole, was ſmall, compared with that of other great fleets in this climate on former occaſions. The greateſt ſquadron, next to this, that had ever been on this ſtation, was that under Admiral Vernon in the year 1741, at the ſame ſeaſon. From this fleet upwards

upwards of eleven thouſand men were ſent to the hoſpital in the courſe of that and the preceding year, of whom there died one in ſeven, beſides what died on board of their own ſhips and in two hoſpital ſhips *. The diſproportion of ſickneſs in the two fleets will appear ſtill greater, when it is conſidered that Admiral Vernon's contained only fifteen thouſand ſeamen and marines †; whereas that under Lord Rodney contained twenty-two thouſand. What added to the ſickneſs of the former was the unfortunate expedition to Carthagena in April, 1741; to which probably it was owing that a much greater proportion of yellow fevers were landed from the fleet at that time than from ours, as appears by the papers left by Mr. Hume, who was then ſurgeon of the hoſpital. The hoſpital was then at a place called Greenwich, on the ſide of the bay oppoſite to Port Royal, and was very large; but it was found to be in a ſituation ſo extremely unhealthy, that it was ſoon after abandoned

* See Eſſay on the Yellow Fever, by Dr. Hume, in a Collection of Eſſays publiſhed by Dr. D. Monro.

† Campbell's Lives of the Admirals, Vol. IV.

and demoliſhed, and the hoſpital has ſince been at Port Royal.

It appears by the tables, that a greater number was put on the liſt under the head of *other complaints* in this month than the laſt. This was owing to the great number of ulcers which I have remarked to keep pace with feveriſh as well as ſcorbutic complaints; for when the conſtitution of the air is favourable to diſeaſe, or the habit of body prone to it, wounds and ſores are found then to be more difficult of cure. There were twelve deaths beſides thoſe occaſioned by what have been called the three epidemics. Of theſe, five periſhed by drowning and other accidents, three died of ulcers, one of wounds received in action, one of *cholera morbus*, and one of an abſceſs.

It has appeared that very few ſhips of this numerous fleet preſerved their health while lying at anchor; and it would ſeem that ſhort and frequent cruiſes are very conducive to health. It was eleven weeks from the time that the firſt of our fleet came to anchor at Jamaica till the main body of it ſailed for America on the 17th of July.

Great

Great fleets are in time of war under the neceſſity of being at one time longer at ſea, and at another time longer in port, than is conſiſtent with the health of the men, the ſhips being obliged to act in concert and to co-operate with each other. This is one reaſon, among others, for ſhips of the line being more ſickly than frigates. As ſhips of war muſt be guided by the unavoidable exigencies of ſervice, it would be abſurd to conſider health only; but if this were to be the ſole object of attention, a certain ſalutary medium could be pointed out in dividing the time between cruiſing and being in harbour; and it is proper that this ſhould be known, that regard may be had to it, as far as may be conſiſtent with the ſervice. I would ſay, then, that men ought not to be more than ſix or ſeven weeks at one time upon ſea victualling, and that a fourth part of their time ſpent in port would be ſufficient to repleniſh their bodies with wholeſome juices. If there is a ſupply of beer, or if the cruiſe or voyage is made in a warm climate, it may in moſt caſes be extended a week or two longer without much riſque of ſcurvy. This computation proceeds on the ſuppoſition, that ſhips are not ſupplied with the

the antiſcorbutic fruits, nor their juices. If they are furniſhed with theſe, they may keep the ſea for four or five months, as has been proved by the voyages that have been made to India ſince the laſt edition of this work. Theſe ſtores are particularly ſerviceable in the preſent improved ſtate of navigation, for in conſequence of the method of aſcertaining the longitude by lunar obſervations, voyages can be protracted to a much greater length than formerly, and the time that uſed to be neceſſary for ſtaying in port with a view to repairs, is ſo much abridged by the late general practice of ſheathing with copper, that war and commerce could not avail themſelves to the utmoſt of theſe admirable inventions unleſs means were fallen upon for preſerving the men from the ſea ſcurvy. The uſe of lemon or lime juice perfectly anſwers this end.

Though contagion is not ſo apt either to ariſe or to ſpread in this climate as in colder ones, there were ſeveral circumſtances about this time tending to prove that it may exiſt in a hot climate. Thoſe ſhips which had their men returned to them from the French prizes, in all of which fevers prevailed,

vailed, had an increaſe of ſickneſs not only in the men that were returned, but in the reſt of the crew. There was another preſumption of contagion, from the proportion of mortality among the ſurgeons and their mates, who were by their duty more expoſed to the breath, effluvia, and contact of the ſick. There died, during our ſtay at Jamaica, three of the former, and four of the latter, which is a greater proportion than what died of any other claſs of officers or men.

It has been the opinion of ſome, that continued fevers do not ariſe from any putrid *effluvia*, except thoſe of the living human body, or ſome ſpecific infection generated by it while under the influence of diſeaſe. It has been alleged in proof of this, that the putrid air in ſome great cities is breathed without any bad effects; and a celebrated profeſſor of anatomy * uſed to obſerve, that thoſe employed in diſſecting dead bodies did not catch acute diſeaſes more readily than other people. I believe this may be true, in a climate like Europe, where cold invigorates the body, and enables it to reſiſt the effects

* The late Dr. William Hunter.

of

of foul air; but I am perſuaded it is otherwiſe in tropical climates. The external heat of the air induces great languor and relaxation, and we cannot breathe the ſame portion of air for the ſame length of time in a hot as in a cold climate, without great uneaſineſs. The want of coolneſs muſt, therefore, be compenſated by a more frequent change of air, and by its greater purity: any foulneſs of the air is accordingly more felt in a hot climate. There is ſomething in purity of air which invigorates the circulation, and refreſhes the body; and the contrary ſtate of it depreſſes and debilitates, and to a much greater degree in a hot climate. There is not quite a fourth part of the common air of the atmoſphere fit for the ſupport of life; and any other admixture, diminiſhing this proportion, will tend to induce diſeaſe, like any other debilitating cauſe, independent of infection or any ſpecific quality, eſpecially where a greater degree of purity is called for in conſequence of the greater degree of heat. There was no reaſon to ſuſpect any infection in the Ville de Paris; for there was no ſickneſs on board of this ſhip when in poſſeſſion of the enemy, and the ſickneſs that prevailed after her being captured

ſeemed

ſeemed to proceed from what may be called ſimple putrefaction. There was an inſtance of the ſame kind in one of our own ſhips of the line, in which a bad fever broke out in the beginning of July, which ſeemed to be owing to the foul air of a neglected hold; for there was a putrid ſtench proceeding from the pumps, which pervaded the whole ſhip. I perceived this very ſenſibly one day, when viſiting ſome officers who were ill of fevers; and before I left the ſhip an alarm was given of two men being ſuffocated in what is called the *well*, which is the loweſt acceſſible part of the hold. This fever was of a very malignant kind, and fell upon the officers more than the men; for ſix of them were ſeized with it, of whom three died on the third day after being taken ill.

The fevers, which were of the greateſt malignity at this time, affected the officers more than the common men. Only one captain died at Jamaica while the fleet was there, and it was of this fever. We loſt five lieutenants, of whom four died of it; and this was the diſeaſe which carried off the three ſurgeons. But foul air was not the only cauſe that produced this fever among

among the officers, ſeveral of whom brought it on by hard drinking, or fatiguing themſelves by riding or walking in the heat of the ſun. It cannot be too much inculcated on thoſe who viſit tropical countries, that exerciſe in the ſun, and intemperance, are moſt pernicious and fatal practices, and that it is in general by the one or the other that the better ſort of people, particularly thoſe newly arrived from Europe, ſhorten their lives.

Before leaving Jamaica, I ſent to England a Supplement to the Memorial given in laſt year *.

CHAP. V.

THE ſeaſon of the hurricanes approaching, and all the convoys deſtined for England this year being diſpatched, the main body of the fleet, conſiſting of twenty-four ſhips of the line, left Port Royal on the 17th of July, under the command of Ad-

* See Appendix to Part II.

miral

miral Pigot, in order to proceed to the coaſt of America. A great convoy for England had been ſent off a few days before, protected by the Ville de Paris and ſix other ſhips of the line, which we overtook and paſſed at the weſtern extremity of Jamaica. When we arrived off the Havannah, a large ſquadron of the enemy was ſeen there in readineſs to ſail, which induced the Admiral to wait in ſight of it for the convoy, which did not come up till ten days after. Owing to this delay, and our meeting with baffling winds on the reſt of the paſſage, we did not arrive at New York till the 7th of September. We found there the Invincible and Warrior, which ſailed after us, but arrived before us, by having taken the windward paſſage.

TABLE,

TABLE, ſhewing the proportional Prevalence of different Diſeaſes, and their Mortality, in July, 1782.

DISEASES.	Proportion of thoſe taken ill in the Courſe of the Month.	Proportion of Deaths, in relation to the Numbers of the Sick.
Fevers - - -	ONE IN 13½	ONE IN 16
Fluxes - - -	24	49
Scurvy - - -	91	0
Other Complaints	20	134
General Proportion	5½	33

The mortality this month, in relation to the whole numbers on board, was one in a hundred and thirty.

There were only one in thirty-eight of the ſick ſent to the hoſpitals.

The fevers aroſe chiefly during the firſt two weeks after leaving Jamaica, which renders it probable that the ſeeds of them

were brought from thence. Had they been owing to the heat ſimply, they would have been as apt to ariſe in ſome ſubſequent part of the paſſage; for the tropical heats at this ſeaſon of the year extend to the 30th degree of latitude, which we did not croſs till the 22d of Auguſt, that is, near five weeks after leaving Jamaica. The only ſhips in which the fever could be imputed to infection or foul air were the Barfleur, Alcide, and the Aimable frigate. The firſt had received, as recruits, at Jamaica, men who had been confined for ſome time before in a French jail, and a fever of a bad kind ſpread on board of her ſoon after. The Aimable was a prize from the French; and the ſickneſs was here ſo evidently owing to foul air, that, whenever the contents of the hold were ſtirred, ſo as to let looſe the putrid effluvia, there was then an evident increaſe of ſickneſs. The fever in the Alcide was of a peculiar ſlow kind, to be deſcribed hereafter, and ſeemed to be a continuation of the ſame infection which had ſo long exiſted in that ſhip.

The Duke, which had hitherto been by far the moſt ſubject to fevers of any ſhip

in the fleet, became more and more free from them even in the moſt early part of this paſſage, and might be ſaid to be entirely ſo at the time ſhe arrived in America. The fever had been ſo very prevalent in this ſhip ſince leaving England, that there was hardly a man who had eſcaped it. Could this have any effect in making them leſs liable to catch it a ſecond time?

In the courſe of this paſſage the dyſenteries came to prevail over the fevers, as we have found to be commonly the caſe at ſea. It appears by comparing this table with the preceding, that the mortality in fevers was much the ſame in both, and that in the dyſentery it was greater than while the fleet was at Jamaica. This does not argue, however, that the diſeaſes were equally malignant, but was owing to the want of an hoſpital, and of thoſe comforts of diet which the ſick enjoyed on board while in harbour. This laſt was particularly felt in the dyſenteries, in the cure of which more depends upon diet than in moſt other diſeaſes. In all the calculations of mortality on board of ſhips, if any have been ſent to the hoſpital, they are to be deducted from the number; and

and theſe make a greater difference in the mortality on board than their numbers ſimply would indicate; for only the worſt caſes, and thoſe therefore who were moſt likely to die, uſed to be ſent to the hoſpital. But as the fleet was at ſea during the whole of this month, no allowance of this kind is to be made.

TABLE, ſhewing the proportional Sickneſs and Mortality in Auguſt.

DISEASES.	Proportion of thoſe taken ill in the Courſe of the Month.	Proportion of Deaths, in relation to the Numbers of the Sick.
	ONE IN	ONE IN
Fevers - - - - -	31	17
Fluxes - - - - -	46	35
Scurvy - - - - -	25	66
Other Complaints - -	27	43
General Proportion, -	7 1/2	31

The mortality this month, in relation to the whole numbers on board, was one in one hundred and ſixty-nine.

The ſcurvy began to appear very ſoon upon this paſſage; for by the end of Auguſt, at which time the fleet had only been ſix weeks at ſea, and that in a warm climate, and in dry weather, it had made conſiderable progreſs. It firſt appeared and prevailed moſt in the Prince George and Royal Oak, though they had been ten weeks at Jamaica. This was the firſt ſickneſs with which the latter had been affected ſince arriving in the Weſt Indies; and there was no perceivable peculiarity in either of them to account for their being ſubject to it more early, or more violently, than the reſt of the fleet. If the diſeaſe is contagious, as has been ſuſpected, there might be a few men on board of them, who, being uncommonly prone to the diſeaſe, would be ſoon affected, and communicate it, or at leaſt haſten the ſymptoms in thoſe who might be leſs prediſpoſed to it. But this is only conjecture. Before the end of the voyage, the whole fleet was more or leſs afflicted with it, though it had been only ſeven weeks and three days at ſea; but the men had received ſo few refreſhments while in port, that their conſtitutions were prepared to fall into this diſeaſe. The Barfleur, Alfred, and Princeſſa,

were

were moſt affected with it next to the two ſhips mentioned above.

The ſeventeen ſhips which arrived from England in February and March were much leſs affected with it than the reſt of the fleet, which was, no doubt, owing to the wine, melaſſes, and ſour krout, with which they were ſo amply ſupplied. Though theſe articles were all expended before leaving Jamaica, yet the good effects of them on the conſtitutions of the men were viſible in the courſe of this paſſage.

The America was the moſt free from it of all the ſhips of the old ſquadron; and this was owing to the extraordinary humanity and attention of the captain *, who, as ſoon as any of the men were taken ill, allowed them wine and other refreſhments from his private ſtore. There was another proof in the Conqueror of the great importance of attending to this diſeaſe in its earlieſt ſtage. Mr. Lucas, the ſurgeon of this ſhip, by watching the firſt beginnings of it, by a proper regulation of diet, and the adminiſ-

* Captain Samuel Thompſon.

tration of the eſſence of malt and juice of limes, not only prevented the progreſs of the diſeaſe, but proved, that, with great attention, it may even be cured at ſea. It is of the utmoſt conſequence in this diſeaſe to put men on the ſick liſt on the very firſt appearance of the ſymptoms, ſo that they may early have the advantage of proper treatment and regimen. It is only at this period of it that the effects of eſſence of malt are ſenſible; but we have ſeen that the juice of certain fruits will cure it in more advanced ſtages.

There is a very important remark ſuggeſted by comparing the two preceding tables with that which follows. It appears that in the month of September a much greater number was taken ill of ſcurvy, and alſo that there died of this diſeaſe a greater proportion than in the two preceding months. All the miſchief from it in that month happened in the firſt week of it, during which as many died as in the whole month of Auguſt; for the fleet came to an anchor on the 7th of September at New-York, where the worſt caſes were immediately ſent to the hoſpital, and thoſe that remained on board were ſupplied with every neceſſary refreſhment.

Had the fleet remained longer at ſea, the mortality would probably have increaſed in the ſame progreſſion; and this circumſtance ought to be well conſidered in undertaking cruiſes.

TABLE, ſhewing the proportional Prevalence of Sickneſs and Mortality in September.

DISEASES.	Proportion of thoſe taken ill in the Courſe of the Month.	Proportion of Deaths, in relation to the Numbers of the Sick.
Fevers - - - - -	ONE IN 49	ONE IN 31
Fluxes - - - - -	46	68
Scurvy - - - - -	15½	39
Ulcers - - - - -	68	0
Other Complaints -	62	226
General Proportion -	7	58

The proportion of deaths, in relation to the whole numbers on board, was one in three hundred and ninety-eight.

About one third of all the ſick were ſent to the hoſpital.

As the proportion of ulcers was uncommonly great, I thought it worth while to make a calculation of it. The Barſleur had the greateſt number; and this ſhip, for cauſes I cannot aſſign, was more afflicted with bad ulcers than any other in the fleet, for ſeveral months together.

The fleet having arrived at New York in this unhealthy ſtate, the firſt care was to make proviſion for the ſick. There were ſomewhat more than fifteen hundred on the ſick liſts of all the ſhips, and the hoſpital could accommodate little more than ſix hundred. In order that it might not be overcrowded, and that each ſhip might have a juſt ſhare of relief, I went round the fleet to aſcertain the due proportion of thoſe caſes that were the moſt proper objects for being ſent on ſhore. All the infectious and acute complaints, and ſome of the worſt ſcorbutics, were accordingly ſent to the hoſpital. Thoſe who were kept on board being chiefly ſuch as were affected with the ſcurvy, were ſupplied with various refreſhments in their reſpective

reſpective ſhips, and ſeemed to recover as ſoon as if they had been ſent on ſhore. They had indeed almoſt every advantage enjoyed by thoſe at the hoſpital; for, beſides freſh meat thrice a week, and ſpruce beer daily in common with the other ſeamen, each man on the ſick liſt was ſupplied every week at the public expence with four pounds of apples and half a pound of ſope. There were alſo thirty caſks of limes taken in a prize, which were diſtributed among the ſcorbutic men, and proved of infinite uſe. Admiral Pigot's great zeal for the good of the ſervice, as well as his natural humanity, induced him to liſten to whatever was propoſed for the benefit of the men.

The ſupply of ſope was a thing entirely new in the ſervice; but the good effect of all the other articles would moſt probably have been defeated, unleſs the men had been furniſhed with the means of cleanlineſs, which is the moſt eſſential requiſite of health, The advantage of this method will appear by the returns of next month to have been very conſpicuous; and it was on this occaſion more than any other that I ſaw realiſed in every

every particular the plan propoſed in the memorial to the Admiralty. It may be added, that the ſick that were left on board were not even without the recreation of the ſhore enjoyed by thoſe at the hoſpital; for moſt of the captains had the attention to ſend daily on ſhore, for amuſement and exerciſe, ſuch as were able to walk. Thus there were all the advantages of an hoſpital obtained at much leſs expence to Government, and without the riſque of intemperance, deſertion, or infection, which are the inconveniencies connected with an hoſpital. What farther contributed to health at this time was, a large quantity of excellent wine with which the fleet was ſupplied.

TABLE,

TABLE, ſhewing the proportional Sickneſs and Mortality in October.

DISEASES.	Proportion of thoſe taken ill in the Courſe of the Month.	Proportion of thoſe died, in relation to the Numbers of the Sick.
	ONE IN	ONE IN
Fevers - - - - -	45	250
Fluxes - - - - -	61	69
Scurvy - - - - -	34	197
Ulcers - - - - -	181	0
Other Complaints -	127	0
General Proportion -	12	196

The proportion of deaths in this month, in relation to the whole number on board, was only one in fourteen hundred and ſeventy-eight.

About one in twenty-nine of the ſick was ſent to the hoſpital.

There was, upon the whole, leſs ſickneſs and mortality in this month than in any other.

other during which I kept records of the fleet. This was, no doubt, owing in part to the climate, but was chiefly the effect of the extraordinary attention paid to the ſupply of refreſhments for the men. The fleet was here exactly in the ſame ſituation, and at the ſame ſeaſon, two years before, but was not near ſo healthy.

Nor were the advantages derived from the great plenty of refreſhments, procured at this time at New York, merely temporary; for the men's conſtitutions were ſo much improved by them, that the part of the fleet which remained under the command of Lord Hood was at ſea for twelve weeks without being affected by the ſcurvy. This was chiefly to be aſcribed to the previous refreſhments; for we have ſeen, that, in a paſſage of ſeven weeks from Jamaica to New York, the fleet was greatly affected with the ſcurvy, in conſequence of not having had the advantages of freſh meat and vegetables when laſt in port. The climate had, no doubt, alſo a ſhare in keeping off the ſcurvy; for the greater part of the twelve weeks was taken up in a cruiſe off St. Domingo; and, I believe, it never was known that a fleet

was

was ſo long at ſea, in a cold climate, without being greatly affected with this diſeaſe.

It appears, that though the proportion of fevers had increaſed ſomewhat this month over that of fluxes, yet the former were leſs fatal; and, I think, the true dyſentery is more frequent in this climate, and more apt to prove fatal in its acute ſtate, than in the Weſt Indies. I have indeed preferred the term flux to that of dyſentery, for this reaſon, that the ſymptoms in many caſes did not riſe ſo high as properly to conſtitute dyſentery; and the diſeaſe proves fatal in the Weſt Indies more frequently in the chronic than in the acute ſtate. The fluxes were daily gaining ground when we left New York, and continued to prevail to a great degree in the Magnificent, which remained in that climate ſeveral weeks after us.

The climate and ſituation of the fleet had a greater effect in diminiſhing ulcers than any other complaints; for the proportion of them in this month is little more than one third of what it was in the laſt.

The

The calculation for October was made upon thirteen ſhips of the line, which ſailed from New York on the 25th of that month.

The weather had then begun to grow cold; but few or none of the diſeaſes peculiar to a cold climate had appeared. There occurred, while we were at New York, ſeveral caſes of inflammation of the liver among the officers and men who came from the Weſt Indies. It was remarked formerly, that this complaint hardly ever occurred in the Weſt Indies; but it would appear that the reſiding there diſpoſes to an inflammation of this organ upon changing to a colder climate.

The preceding ſummer had been uncommonly cold, not only in North America, but in the whole temperate part of the northern hemiſphere, ſo far as I could learn by inquiry. In conſequence of this, the crops failed in Europe, America, and the northern parts of Aſia. The ſame circumſtance had a remarkable effect on the reigning diſeaſes of the ſeaſon at New York; for inſtead of the bilious complaints common in the end of ſummer and in autumn, a ſlight

a ſlight fever of the inflammatory kind had prevailed. An epidemic catarrh had ſpread all over Europe, and ſome part of Aſia, in the earlier part of the year; and perhaps this was connected with the peculiar ſtate of the atmoſphere about this time. It was before obſerved, that there was ſomething unuſual in the ſtate of the weather at Jamaica while the fleet lay there; and it is poſſible that this might be owing to the ſame general cauſe.

CHAP. VI.

THIRTEEN ſhips of the line ſailed from America for the Weſt Indies on the 25th of October, under the command of Admiral Pigot, and the other half of the fleet was left under Lord Hood, to watch the motions of the French ſquadron, which was then at Boſton.

The day on which we left the coaſt of America a ſtorm came on, which laſted two days; but the reſt of the paſſage being

ing fair and moderate, we arrived at Barbadoes on the 20th of November, where the fleet continued for the remainder of this month.

All the above-mentioned ſquadron, except two ſhips, is comprehended in the calculation of the following table, and alſo the Magnificent, Prudent, and Nonſuch. The two laſt had continued in the Weſt Indies during our abſence.

TABLE, ſhewing the Prevalence of Sickneſs and Mortality in November.

DISEASES.	Proportion of thoſe taken ill in the Courſe of the Month.	Proportion of Deaths, in relation to the Number of Sick.
Fevers - - - - -	ONE IN 54	ONE IN 25
Fluxes - - - - -	ONE IN 78	ONE IN 132
Scurvy - - - - -	ONE IN 86	ONE IN 0
Ulcers - - - - -	ONE IN 94	ONE IN 0
Other Complaints -	ONE IN 46	ONE IN 103
General Proportion -	ONE IN 15	ONE IN 77

About

About a ſixth part of the whole ſick were ſent to the hoſpital this month, and one half of theſe were ſent to the hoſpital at Halifax from the Magnificent.

The proportion of deaths this month, in relation to the whole number on board, was one in eight hundred and eighty-ſeven.

Fewer were taken ill this month than the preceding, but more in proportion died; which might partly be owing to the fleet having been more at ſea, and partly to the change of climate.

Fevers were now more numerous, and alſo more fatal than any other diſeaſe; and we ſee them follow the contrary proportion to fluxes in the progreſs to the ſouthward, that they did in our progreſs to the northward. Theſe fevers prevailed chiefly in the Formidable and Warrior. In the former it firſt appeared among ſome men that had been preſſed at New York from a privateer, ſome of whom were ſeized a few days after our arrival at Barbadoes with the yellow fever, and they were the only inſtances of it at this time in the fleet.

The ſcurvy continued to diminiſh, but the ulcers increaſed as we came into the torrid zone.

Diſeaſes in general were ſo ſlight and ſo few at this time, that the whole ſquadron from America ſent only forty-eight men to the hoſpital at Barbadoes from its arrival to the end of the month.

It may be proper here to give an account of ſome of the ſhips that remained on this ſtation, while the main body of the fleet was in America.

The Prudent, when ſhe left us, was extremely healthy, and continued ſo till a flux broke out in July, which was communicated by ſome men from a cartel, who were ill of this diſeaſe. It ſpread among the ſhip's company, and prevailed for three months. The only deaths during the ſeven months that this ſhip was ſeparated from the fleet were, two from flux, and one from ſcurvy, and only twenty-five were ſent to hoſpitals. This is a proof how much more healthy the windward ſtation is than that of Jamaica. The ſcurvy aroſe at one time, in a cruiſe

cruiſe of five weeks, though there was no appearance of it at another time in a cruiſe of ſix weeks. The cauſe of this ſeems to be the difference of the weather at the two periods; for it was very wet in the former, and very dry in the latter. The time in which this ſhip was moſt expoſed to ſickneſs was while ſhe was under repair at Antigua, a ſituation in which hardly any ſhip eſcapes a ſevere viſitation of ſickneſs; yet this ſhip was not at all affected by it, which ſeemed to be owing to the uncommon pains taken by the captain to prevent the men from labouring in the ſun during the hot part of the day.

The Nonſuch was five months ſeparated from the fleet, during which time ten men died. Nine of theſe died of fevers, and one of the dyſentery. She ſailed from Jamaica for Barbadoes about the ſame time that the fleet ſailed for North America, and was nine weeks on the paſſage. A fever was the prevailing diſeaſe, and the men probably inhaled the ſeeds of it at Jamaica, in common with moſt of the other ſhips' companies that were there. The ſcurvy, which had formerly prevailed ſo much, appeared

at this time; but it was in a very moderate degree, conſidering the length of the paſſage. None died of it, and few were ſo ill as to require being ſent to the hoſpital. Had this ſhip gone into a colder climate, like the others, it would probably have prevailed to a greater degree. The whole number ſent to the hoſpitals for various complaints, during the five months, was only thirteen.

The Nymph frigate was the only other ſhip left in the Weſt Indies which is included in the tables. There happened only two deaths in her from June to October, both months included. One of theſe was from ſcurvy, the other from aſthma. She was in that time upon two cruiſes, each of which laſted eight weeks. During the firſt the weather was dry and fine, and during the other it was wet and ſultry, with the ſame effect upon health as in the Prudent; for in the ſecond cruiſe the ſcurvy prevailed to a conſiderable degree, but not at all during the firſt. This diſeaſe was prevented from becoming violent or fatal, on either occaſion, by the great attention of Mr. Anderſon, the ſurgeon. He found great benefit from the eſſence of malt, when given

early in the complaint; and ſome limes having been taken in a prize, while this diſeaſe was at the worſt, the ſcorbutic men were ſo much recovered by the uſe of them, that they were all able to return to duty before the ſhip arrived in port.

DECEMBER.

The whole ſquadron remained at anchor at Barbadoes, and nothing worth notice occurred till the arrival of a reinforcement of eight ſhips of the line, under Sir Richard Hughes, on the 8th of December. This ſquadron had been detached by Lord Howe, after the relief of Gibraltar, and the action with the combined fleets of France and Spain on the 20th of October. It conſiſted of one ſhip of 90 guns, one of 80, three of 74, and three of 64. They ſailed from England on the 9th of September, and from that time till their arrival at Barbadoes they had not been in port, except for ten days that they were at Madeira, where they were ſupplied with freſh meat, fruit, and vegetables, by which means the ſcurvy, which had begun to prevail to a conſiderable de-

gree, was almoſt entirely eradicated, and the health of the men was ſurpriſingly reſtored, conſidering the ſhortneſs of the time.

When they joined us, however, there was a good deal of ſickneſs on board of them all, except the Union and Ruby. The former had been more than three years in commiſſion, and in that time had never been ſickly, and had now all the advantages of a long-eſtabliſhed and well-regulated ſhip's company. All the reſt had been newly commiſſioned and manned when they left England. The ſuperior health of the Ruby was owing to her having been manned with the crews of other ſhips, ſome of which had juſt arrived from the Weſt Indies; whereas the others had been manned chiefly by draughts of preſſed men from guardſhips, or by raw volunteers, of whom a great many were raiſed in Ireland about this time. The Bellona and Berwick having been ſomewhat longer in commiſſion than the reſt, were leſs ſickly.

The following tables will ſhew the comparative ſtate of health of the ſquadron formerly on the ſtation with that which had newly arrived from England.

TABLE,

TABLE, ſhewing the Prevalence of Sickneſs and Mortality in the old Squadron, in December.

DISEASES.	Proportion of thoſe taken ill in the Courſe of the Month.	Proportion of Deaths, in relation to the Numbers of Sick.
Fevers - - -	ONE IN 32	ONE IN 80
Fluxes - - -	94	99
Scurvy - - -	62	0
Ulcers - - -	64	0
Other Complaints	57	71
General Proportion	11½	124

The proportion of the deaths this month to the whole number of men belonging to this part of the fleet, was one in eleven hundred and two. There were fifty-ſix ſent to the hoſpital, which was one in eighteen of all the ſick.

TABLE, ſhewing the Prevalence of Sickneſs and Mortality in the new Squadron, in December.

DISEASES.		Proportion of thoſe taken ill in the Courſe of the Month.		Proportion of Deaths, in relation to the Number of Sick.
Fevers - - -	ONE IN	11	ONE IN	55
Fluxes - - -		86		0
Scurvy - - -		107		0
Ulcers - - -		191		0
Other Complaints		56		54
General Proportion		5		64

The proportion of the deaths this month to the whole number of men belonging to this part of the fleet, was one in four hundred and forty.

There were one hundred and eighty-nine ſent to the hoſpital; but the proportion to the whole number of ſick cannot be aſcertained, as we do not know how many were on the liſt on the firſt of the month.

The

The increaſe of fevers in the old ſquadron was chiefly owing to their having ſpread in the Nonſuch; and they ſeemed to partake more of that kind which originates in jails and ſhips, than of that which is peculiar to the climate. The body of one of the men who died of this fever was inſpected at the hoſpital, and there was found to be inflammation and even perforation of the inteſtines, without any previous ſymptom that could lead to expect ſuch an appearance, a circumſtance more likely to happen in the former ſort of fever than the latter.

The increaſe of ſcurvy was owing to the numbers that were taken ill of it in the Magnificent on the paſſage from Halifax, from whence ſhe ſailed in the beginning of this month, and joined the fleet at Barbadoes in the end of it. There was a great deal of ſickneſs in this ſhip at Halifax, and on the paſſage, owing to the want of ſuch clothing as was ſuitable to that ſevere climate. One of the principal complaints was an inflammatory ſore throat.

The great degree of health at this time enjoyed by the ſhip's company of the Agamemnon deſerves particular attention, as it ſeemed to be owing to a circumſtance in the

the mode of victualling, which might, without any expence, and with little trouble, be rendered general in the navy. This conſiſted in the uſe of ſoft bread, that ſhip having been ſupplied about this time with flour in place of biſcuit. For thirteen weeks the whole ſhip's company had no bread but what was baked on board, and a certain proportion of it from that time till her arrival in England, in May 1783, at which time there was not a ſick man on the liſt.

Baking may be managed with ſtill greater facility now that the fire-place of ſhips of war is made of caſt iron in place of brick-work as formerly. In the oven attached to the fire-place of a firſt rate, thirty-ſix quartern loaves can be baked at once, ſo that as often as the copper is uſed for boiling proviſions baking can be performed without the leaſt expence or inconvenience.

There was no change in the ſituation of the fleet, only that four ſhips of the line were ſent on the 16th to cruiſe near Guadaloupe, and they continued at ſea till the beginning of February.

The new ſquadron was much afflicted with the jail fever, brought from England; and

and it was much more prevalent, as well as malignant, on board of the Suffolk than any of the reſt. During the paſſage it prevailed moſt in the Princeſs Amelia, not leſs than twenty having died of it. It ſubſided in this ſhip before ſhe arrived in the Weſt Indies; but on board of the Suffolk it continued to rage for ſome months after.

As the hoſpital at Barbadoes was too ſmall to contain all the ſick of this ſquadron, only the caſes of greateſt danger and the moſt infectious were ſent on ſhore, and thoſe that remained were provided with freſh vegetables and milk on board of their own ſhips, in the ſame manner as had been formerly practiſed with ſuch ſucceſs on ſimilar occaſions. This was continued for four weeks, during which time they all got into tolerable health, except the Suffolk.

There appeared, by the returns of the new ſquadron, to be a greater number under the head of "Other Complaints," which was owing to the number of pulmonic complaints, the conſequence of the influenza which prevailed in Europe, at ſea, as well as on ſhore, in the ſpring and beginning of the ſummer of this year.

Though

Though inflammatory complaints are rare in this climate, yet in a few of the ſhips there was ſome appearance of them; and I remarked that they occurred in thoſe ſhips which were in other reſpects moſt healthy, and moſt free from infection. A good many of the men were ſeized with inflammatory ſore throats in the Bellona a few days before ſhe arrived at Barbadoes, and this was in other reſpects the moſt healthy ſhip next to the Union and Ruby. In the Union there was no violent acute complaint whatever, which was very ſingular among ſo great a body of men; but ſeveral rheumatiſms, coughs, and catarrhs, aroſe in her this month, and there even occurred two pleuriſies in the following month. The bowel complaints which occurred on board of this ſhip were alſo of an inflammatory nature. Theſe diſtempers ſeemed to proceed from accidental expoſure and irregularity; and is it not highly probable that theſe cauſes, inſtead of producing local inflammatory complaints, might have been the means of exciting bad fevers and fluxes, as in the other ſhips, had the men been equally prediſpoſed to them, by living in foul air, or under the influence of infection?

The

The following tables will ſhew the comparative ſtate of health of the two ſquadrons in the three firſt months of next year.

TABLE, ſhewing the Prevalence of Sickneſs and Mortality in the old Squadron in January, 1783.

DISEASES.	Proportion of thoſe taken ill in the Courſe of this Month.		Proportion of Deaths, in relation to the Numbers of the Sick.	
Fevers - - - - -	ONE IN	67	ONE IN	70
Fluxes - - - - -		157		0
Scurvy - - - - -		44		0
Ulcers - - - - -		0		0
Other Complaints -	0	48	0	117
General Proportion -		12½		214

The mortality this month, in relation to the whole numbers on board, was one in twelve hundred and fifty-ſeven. About one fifteenth of all the ſick were ſent to the hoſpital.

TABLE,

TABLE, ſhewing the Prevalence of Sickneſs and Mortality in the new Squadron in January, 1783.

DISEASES.	Proportion of thoſe taken ill in the Courſe of the Month.	Proportion of Deaths, in relation to the Numbers of the Sick.
Fevers - - - - -	ONE IN 12	ONE IN 48
Fluxes - - - - -	29	153
Scurvy - - - - -	320	0
Ulcers - - - - -	137	0
Other Complaints -	19	0
General Proportion -	$5\frac{1}{2}$	109

The proportion of deaths to the whole number on board was one in five hundred and forty. About one in thirty of all the ſick were ſent to the hoſpital.

TABLE,

TABLE, ſhewing the Prevalence of Sickneſs and Mortality in the old Squadron in February.

DISEASES.	Proportion of thoſe taken ill in the Courſe of the Month.	Proportion of Deaths, in relation to the Numbers of the Sick.
Fevers - - - - -	ONE IN 46	ONE IN 69
Fluxes - - - - -	159	0
Scurvy - - - - -	63	0
Ulcers - - - - -	100	0
Other Complaints - -	51	136
General Proportion, -	13½	173

The proportion of deaths to the whole number on board was one in ſixteen hundred and ninety-ſeven. One ninth of all the ſick were ſent to the hoſpital.

TABLE,

TABLE, ſhewing the Prevalence of Sickneſs and Mortality in the new Squadron in February.

DISEASES.	Proportion of thoſe taken ill in the Courſe of the Month.	Proportion of Deaths, in relation to the Numbers of the Sick.
Fevers - - - - -	ONE IN 30	ONE IN 50
Fluxes - - - - -	34	0
Scurvy - - - - -	212	0
Ulcers - - - - -	174	0
Other Complaints -	52	0
General Proportion -	11	185

The proportion of deaths to the whole number was one in twelve hundred and ſeventy-ſix. The proportion ſent to the hoſpital was the ſame this month as in the other part of the ſquadron.

TABLE,

TABLE, ſhewing the Prevalence of Sickneſs and Mortality in the old Squadron, in March.

DISEASES.		Proportion of thoſe taken ill in the Courſe of the Month.		Proportion of Deaths, in relation to the Numbers of Sick.
Fevers - - - - -	ONE IN	28	ONE IN	12½
Fluxes - - - - -		71		0
Scurvy - - - - -		46		0
Ulcers - - - - -		226		0
Other Complaints - -		76		44
General Proportion -		11		194

The proportion of deaths to the whole number was one in thirteen hundred and ſixty-one. About one ninth of all the ſick were ſent to the hoſpital.

TABLE, ſhewing the Prevalence of Sickneſs and Mortality in the new Squadron, in March.

DISEASES.	Proportion of thoſe taken ill in the Courſe of this Month.	Proportion of Deaths, in relation to the Numbers of Sick.
Fevers - - - - -	ONE IN 44	ONE IN 0
Fluxes - - - - -	49	0
Scurvy - - - - -	123	0
Ulcers - - - - -	183	0
Other Complaints -	38	138
General Proportion -	12	403

The proportion of deaths to the whole number was one in four thouſand and eighty-ſeven. About one in eleven of all the ſick were ſent to the hoſpital.

The main body of the fleet remained at Barbadoes till the 12th of January, when

they went to cruiſe to windward of Martinico, with a view to intercept a French ſquadron expected from North America. This cruiſe laſted four weeks; and intelligence being received of the enemy's having taken a different route, the whole fleet bore away for St. Lucia, where it came to an anchor on the 8th of February.

In the courſe of the three months above mentioned, we ſee the two ſquadrons approaching to each other, in point of health, till they became pretty equal and ſimilar; and the new ſquadron became even ſomewhat more healthy than the old.

The increaſe of fevers in the old ſquadron was owing to two cauſes. One was the importation of new-raiſed recruits brought from England by ſome ſhips that arrived in the beginning of January. Theſe were diſtributed to ſuch ſhips as ſtood moſt in need of men; and being very dirty and ill cloathed, were likely to harbour infection. They were evidently the cauſe of ſickneſs in the Warrior and Royal Oak; for theſe ſhips were before that time healthy, and the fever began with theſe ſtrangers, and ſpread

amongſt the former crew. It is remarkable that the ſhips that brought them from England were not affected by them.

It was caught in the Royal Oak from ſix men that came from England in the Anſon, which men, though firſt put on board the Namur, communicated no fever there, having been kept ſeparate from the reſt of the men; but being ſent to the Royal Oak, they were themſelves firſt taken ill with a fever, which afterwards ſpread to about thirty of the other men. What was ſingular in this fever was, that the eyes and ſkin of all that were affected by it became yellow, though without any particular malignancy; for only two died on board, and one in the hoſpital. There was one whoſe ſkin was very yellow, yet his complaint was ſo ſlight as never to confine him to his bed.

The other cauſe of the increaſed proportion of fevers in the old ſquadron was, the great number of theſe complaints that aroſe in the Magnificent. This ſhip having been ſent on a cruiſe about the middle of February, and the weather being rainy, ſqually, and uncommonly cold, for the climate, many

many fevers of the inflammatory kind appeared. During this cruiſe ſhe made prize of a large French frigate, called the Concord, and the greater part of the priſoners being taken on board, the fever from that time aſſumed a different type, with new and uncommon ſymptoms; for, inſtead of being inflammatory and requiring bleeding, as before, it became more of a low, putrid kind, and was attended in moſt caſes, if not in all, with a continual ſweating; ſo that, inſtead of evacuations, the remedies that were found moſt effectual were the Peruvian bark, bliſters, and opium. Thus we ſee fevers variouſly modified according to men's conſtitutions, the ſtate of the air, and the noxious *effluvia* of the ſtrangers that intermix with them.

We find the proportion of fluxes increaſing in the new ſquadron in January and February, as they had formerly done in moſt of the ſhips ſoon after their arrival from England. They were obſerved alſo to prevail principally in thoſe ſhips that had formerly been moſt ſubject to fevers, and not to ariſe till the fever had ſubſided. They were found, for inſtance, to ariſe later in

the Suffolk, where the fever was obſtinate and malignant, than in the Princeſs Amelia, where the fever had been at one time general and fatal, but not ſo violent and laſting as in the other.

The four ſhips that were ſent to cruiſe near Guadaloupe continued at ſea for ſeven weeks; and it was owing to the prevalence of ſcurvy in theſe and in the Magnificent, that the proportion of that diſeaſe was greater at this time in the old than in the new ſquadron.

The fleet remained at St. Lucia till the accounts of the peace arrived in the beginning of April. The ſervice was then at an end, and I returned to England with the firſt diviſion of the fleet, which ſailed from St. Lucia on the 12th of April, under the command of Rear-admiral Sir Francis Drake, who was at this time in extremely bad health, and requeſted me to accompany him.

PART

PART I.

BOOK III.

Of the Numbers and Mortality of different Diſeaſes ſent to Hoſpitals.

CHAP. I.

IN order to judge of the loſs ſuſtained by diſeaſe in the courſe of that ſervice of which a relation has been attempted, the ſick ſent to the hoſpitals muſt be taken into account. I ſhall, therefore, exhibit a ſhort view of the different diſeaſes admitted, and their mortality, at the ſeveral hoſpitals connected with the fleets in which I ſerved. This will ſerve alſo to illuſtrate the different effects that different ſituations have upon the health and recovery of men*.

The fleet which effected the firſt relief of Gibraltar, under the command of Lord

* As my own ſtay at different ports was ſhort, and as my own knowledge could not extend beyond that period, Dr. Farquarſon, Firſt Commiſſioner of Sick and Wounded Seamen, very politely gave me leave to inſpect the books of the different hoſpitals at his office, and I collected from them the fate of all the men that were landed.

Rodney, conſiſting of twenty ſhips of the line, arrived there in the third week of January, 1780, after a paſſage of three weeks and a few days from England, in which they had an action with the Spaniſh fleet, and obtained a victory over them, on the 16th of that month. The whole fleet, except one ſhip, ſailed from Gibraltar on the 13th of February, and while it lay there, the diſeaſes ſent to the hoſpital, and their reſpective mortality, were as follows *:

* It is proper to mention, that the name of the diſeaſe in the hoſpital books being taken from the ticket ſent on ſhore with each ſick perſon, great accuracy is not to be expected, as this is frequently done in a careleſs manner. My returns were made with great exactneſs; and, in the latter part of the war, the hoſpital books may alſo be depended upon in this reſpect, the tickets, at my requeſt, having been made out with accuracy.

Fevers

DISEASES.	Admitted.	Died.	Proportion. ONE IN
Fevers - - - -	622	65	$9\frac{1}{2}$
Fluxes - - - -	17	0	0
Scurvy - - - -	13	1	13
Ulcers - - - -	20	3	7
Wounds - - -	29	9	3
Other Complaints	12	3	4
* Total - -	713	79	9

This comprehends not only the deaths in the time the fleet remained there, but all that happened afterwards. The mortality, from wounds and ulcers, is greater than might be expected in ſo fine a climate, and at the cooleſt ſeaſon of the year; but as the place was then beſieged, the ſick and wounded could not be ſupplied with thoſe refreſhments that were neceſſary to the recovery of the men, and wounds and ulcers are complaints very apt to be affected by the quality of the diet.

* In this, and the other tables, the ſmaller fractions are neglected.

The

The following is an Account of the Men admitted at the Hoſpital at Barbadoes in the Campaign of 1780, that is, from the 16th of March till the end of June:

DISEASES.	Admitted.	Died.	Proportion. ONE IN
Fevers - - - -	277	43	6½
Fluxes - - - -	70	22	4
Scurvy - - - -	199	47	4
Ulcers - - - -	92	16	5½
Wounds - - -	167	61	2½
Other Complaints	129	23	5½
Total - -	943	212	4

The fevers were chiefly from the five line-of-battle ſhips that came immediately from Europe in March. Upon their arrival they ſent on ſhore one hundred and ninety-three men ill of fevers, only one with the flux, fifteen with the ſcurvy, and five with ulcers.

When

When theſe ſhips returned to Barbadoes in May, along with the reſt of the fleet, the greater part of the ſick were then alſo on board of them. By that time the flux and ſcurvy had broke out. The former prevailed chiefly in the Terrible; the latter in the Intrepid. That part of the fleet which we found on the ſtation ſent on ſhore a very ſmall proportion of all the claſſes of complaints, except wounds.

Of the wounds, nineteen were amputations, of which there died nine, moſtly of the locked jaw. There were forty-ſix ſcorched by gunpowder, of whom there died fourteen; ſo that, beſides thoſe who were killed outright, and thoſe who died on board in conſequence of accidents of this kind, before they could be ſent to an hoſpital, about one-fourth of all the wounds, and the ſame proportion of all the deaths from wounds, at the hoſpital, was owing to this cauſe. This circumſtance ought to induce commanders to take every precaution to prevent ſuch accidents. In the ſubſequent part of the war they were leſs frequent, in conſequence of that greater caution, and more accurate method

thod of working great guns, which were acquired by practice and experience *.

In the account of the mortality, I have included only ſuch as died before the 1ſt of January, 1781; for if any were carried off after that time, it was moſt probably by ſome incidental complaint. There were ſixty-five of them at that time remaining, and they were chiefly men diſabled by lameneſs waiting for a paſſage to England as invalids.

Out of the twenty-three that were killed by the fall of the houſe in the hurricane on the 10th of October, eight were of the number above accounted for; but theſe are not included in any of the claſſes of deaths.

The mortality among the men admitted at this time was greater than what occurred afterwards in any of the hoſpitals that I attended, except that at Jamaica. The principal cauſe of this was, that as the fleet was ſo much greater than had ever been known here before, there was not ſuitable accom-

* See the laſt chapter of Part III.

modation

modation for ſuch numbers as it was neceſſary to ſend on ſhore, and we had not then fallen on the method of ſupplying refreſhments to the men on board of their ſhips. The circumſtance by which the men ſuffered moſt was, the great crowding which the want of room made neceſſary. There is here no public building appropriated for an hoſpital; ſo that this, as well as every thing elſe, being found by contract, and the number of ſick being ſo much greater than it was uſual to provide for, the whole was at this time conducted in a manner unfavourable to recovery.

It appears that the greateſt mortality in any claſs of diſeaſe was that of the fluxes, of which the greateſt number ſent to hoſpitals are ſuch as have languiſhed for ſome time under this diſeaſe, in which ſtate it generally proves fatal in the Weſt Indies, in conſequence of incurable ulcers in the great inteſtines, to which the heat of the climate, as well as the ſcorbutic habit and ſea diet, is particularly unfavourable. But the whole of the miſchief ariſing from it does not appear in the table; for it was the moſt apt of any diſeaſe to ſupervene upon other complaints.

plaints which were under cure at the hoſpital. It more particularly attacked thoſe who were recovering from the ſcurvy, and was the cauſe of the greater number of deaths under this head in the table. It was found to be more contagious than fevers, either becauſe the men's conſtitutions were more prediſpoſed to it, or, perhaps, becauſe the infectious matter of it being more groſs and leſs volatile, it is not ſo readily diſſipated by the heat of the climate; for, either from this, or ſome other circumſtance, infectious fevers are not ſo eaſily generated, nor ſo apt to ſpread, as in Europe. That theſe fluxes were owing to infection may be inferred from hence, that, when men ill of the ſcurvy were cured on board of the ſhips they belonged to, they were not liable to this diſeaſe, neither did they prevail at theſe hoſpitals afterwards, when great care was taken to ſeparate infectious diſeaſes from the others.

The only regular hoſpital on this ſtation is that at Antigua. This iſland being the ſeat of the royal dock-yard, there is an eſtabliſhed hoſpital in time of peace as well as war. It ſo happened, that great fleets never came

came here to put their ſick and wounded on ſhore, as at Barbadoes; ſo that the greater number of thoſe received into it were from ſingle ſhips that went to careen. As there was, therefore, leſs neceſſity for crowding, and as the ſlighter caſes could be admitted, there was a leſs proportion of deaths here than at moſt of the other hoſpitals.

There were two other eſtabliſhments for the reception of the ſick and wounded on this ſtation, but they were only temporary. Theſe were at St. Lucia and St. Chriſtopher's, where the men being received in great numbers at a time from large fleets, and as there were accommodations only for the moſt urgent caſes, the mortality approached more nearly to that of Barbadoes. There died at St. Chriſtopher's, in the years 1780, and 1781, in the proportion of one in ſix, and at St. Lucia, in the ſame time, one in five and a half, or two in eleven. The air of the hoſpital at St. Lucia was remarkably pure, and this degree of mortality was owing to the ſick having been accommodated in tents and huts. In the two laſt years of the war, when an hoſpital was built, and regularly eſtabliſhed, the mortality

lity was not much more than one half of this.

Some authors have endeavoured to form an eſtimate of practical ſkill from the different rates of mortality; but this is extremely fallacious; for the fatality of diſeaſes will depend on their violence, the proportion of deaths being very different in caſes that are ſlight, from what it is in thoſe that are dangerous. We ſhall take a view, however, of the hoſpital at Barbadoes at another period, in which there ſeemed little or no difference in the violence of the diſeaſe, and when the ſuperior ſucceſs ſeemed to be owing to the hoſpital's not being ſo crowded, and to the better attendance and treatment of the ſick. The following is a view of the diſeaſes that were admitted in the laſt three months of the year 1782, the greater part of which were landed from the reinforcement of eight ſhips of the line that joined the fleet at Barbadoes in the beginning of December:

Fevers

DISEASES.	Admitted.	Died.	Proportion.
Fevers - - - - -	224	29	NEARLY 8
Fluxes - - - - -	17	6	NEARLY 3
Scurvy - - - - -	50	5	ONE IN 10
Ulcers - - - - -	25	10	ONE IN 2½
Other Complaints -	46	8	NEARLY 6
Total - -	362	58	NEARLY 6

It happened on this, as on the former occaſion, that none were ſent on ſhore but ſuch as were very ill, or had contagious complaints, the reſt being provided with refreſhments on board of their ſhips. There were no wounds at this time, but there was a greater proportion of fevers; ſo that the complaints, upon the whole, might be ſaid to be equally dangerous, or nearly ſo. The mortality now was, however, conſiderably leſs, and this is to be imputed to the more favourable ſituation of the hoſpital, which I did not allow to be over-crowded; and the

men had all manner of juſtice done them in point of attendance and accommodation.

I ſhall give another example of the ſame kind in the hoſpital at Jamaica, when our fleet went there after the battle of the 12th of April. All the men accounted for here were landed from the fleet under Lord Rodney in May, June, and July, 1782 *.

DISEASES.	Admitted.	Died.	Proportion.
Fevers - - -	224	71	NEARLY ONE IN 3
Fluxes - - -	65	23	NEARLY ONE IN 3
Scurvy - - -	48	10	NEARLY ONE IN 5
Ulcers - - -	92	21	NEARLY ONE IN 4
Wounds - - -	70	18	NEARLY ONE IN 4
Other Complaints	40	18	NEARLY ONE IN 2
Total - -	539	161	NEARLY ONE IN $3\frac{1}{2}$

This

* In the year 1741, the fleet under Admiral Vernon was at Jamaica at the ſame time of the year; and the following

This uncommon degree of mortality was not owing to the bad air of the place, for Port Royal is naturally as healthy as moſt parts in that climate; nor was it owing to bad accommodations, or to neglect of any kind; but is imputable entirely to this circumſtance, that the hoſpital being much too

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following is the account of the men ſent to the hoſpital in May and June.

DISEASES.	Admitted.	Died.	Proportion
Fevers - - - -	957	255	NEARLY ONE IN 3½
Fluxes - - - -	267	73	NEARLY ONE IN 3½
Scurvy - - - -	314	41	NEARLY ONE IN 7½
Other Complaints -	167	26	NEARLY ONE IN 6
Total - -	1,703	395	NEARLY ONE IN 4

There was on board of this fleet about two-thirds of the number of men that was on board of the fleet in 1782. I cannot aſcertain how many died on board of the ſhips in Admiral Vernon's fleet; but the deaths at the hoſpital alone are ſomewhat more than what happened to our fleet both on board and at the hoſpital.

ſmall, thoſe only were ſent to it who were very ill. There were at this time upwards of forty ſhips of the line at Jamaica, and an hoſpital, containing only three hundred beds, could afford but a very inadequate relief. Some officers are unwilling that any man ſhould die on board of their ſhips, for fear of diſpiriting the others; and many were ſent to the hoſpital, in the moſt deſperate ſtage of ſickneſs, that they might there die.

There cannot be a ſtronger proof than this of the fallacy of judging of the ſucceſs of practice by the proportion of the deaths; for the ſick on this occaſion were better accommodated, better provided for in every reſpect, and as regularly attended, as at any other period of my ſervice in the Weſt Indies, yet the mortality was greater than at any other time.

Having given inſtances of the common rate of mortality in hoſpitals in Europe and the Weſt Indies, I ſhall next give examples of the ſucceſs we had in North America, when

when the fleet was there in the autumns of 1780 and 1782.

ACCOUNT of the Sick landed at New York from the Weſt-India Fleet, conſiſting of eleven Ships of the Line, in Autumn, 1780.

DISEASES.	Admitted.	Died.	Proportion.	
Fevers - - - -	34	9	NEARLY ONE IN	4
Fluxes - - - -	229	27		9
Scurvy - - - -	433	40		11
Ulcers - - - -	47	8		6
Other Complaints	82	10		8
Total - -	825	94		9

ACCOUNT of the Sick landed at New York from the Weſt-India fleet, conſiſting of twenty-ſix Ships of the Line, in Autumn, 1782.

DISEASES.	Admitted.	Died.	Proportion.	
Fevers - - - -	104	14	NEARLY ONE IN	7
Fluxes - - - -	131	14		9
Scurvy - - - -	617	30		20
Ulcers - - - -	74	10		7
Other Complaints	70	4		17
Total - -	996	72		14

The difference of mortality here, from what occurred in the Weſt Indies, is partly imputable to climate, and partly to the ſmaller proportion of acute diſeaſes. In the two accounts laſt ſtated, the difference in

favour of the latter ſeemed chiefly to ariſe from the ſuperior attention to the ſick, and the better treatment of them. It was mentioned before, that in autumn, 1782, at New York, they were better ſupplied, both at hoſpitals and on board of their ſhips, with every thing that could be wiſhed, and that on this occaſion almoſt every ſcheme I had propoſed was realiſed. The extraordinary ſucceſs in the ſcurvy was owing to the great quantities of vegetables that were ſupplied; for ſeveral fields of cabbages had been planted in the neighbourhood of the hoſpital for the uſe of the ſick. This was owing to the humane attention of Admiral Digby, who had alſo cauſed cows to be purchaſed to ſupply the hoſpital with milk. Cleanlineſs, and the ſeparation of diſeaſes, were alſo ſtrictly attended to; and I am perſuaded that many of the ſcorbutic men were ſaved by keeping them ſeparated from the fevers and fluxes; for it has been obſerved, that men recovering from ſcurvy are very ſuſceptible of infection, particularly from the flux.

It appears, that the diſeaſe in which climate makes the greateſt difference is the flux. It was obſervable, that though the dyſentery at this time was more fatal on board of the ſhips at New York than in the Weſt Indies, yet it was leſs ſo at the hoſpital. The cauſe of this ſeems to be, that the acute ſtate of this diſeaſe, of which men die on board before there is time to remove them to an hoſpital, is more fatal in a cold climate; but when it becomes more protracted, which is the caſe with moſt of the caſes ſent to hoſpitals, they then do much better in a cold than in a hot climate.

I ſhall here ſubjoin an account of the numbers that were admitted, and who died, during the whole war, at the hoſpitals of the different ports at home and abroad, at which the fleets to which I belonged at any time touched.

At

	Admitted.	Died.	Proportion.
At Gibraltar - -	2,131	203	10
Barbadoes - -	4,604	861	5
Antigua - -	6,099	914	7
St. Lucia - -	3,363	478	7
St. Chriſtopher's	853	142	6
Jamaica - -	10,088	1,672	6
New York - -	17,880	2,179	7½
Total - -	45,018	6,449	7

NEARLY ONE IN

I have been able to calculate the numbers of deaths from diſeaſe in this great fleet, both on board and at hoſpitals, during the period of my own ſervice, which was three years and three months, and they amounted to three thouſand two hundred *, independent

* I was enabled, after coming to England, to aſcertain the deaths in that part of the ſquadron from which I happened at any time to be abſent, by having leave from the

dent of thoſe that were killed and died of wounds.

There died of diſeaſe in the fleet I belonged to, from July 1780 to July 1781, about one man in eight, including both thoſe who died on board and at hoſpitals *. But the annual mortality in the Weſt-India fleet, during the laſt year of the war, that is, from March 1782 to March 1783, was not quite one in twenty †. This difference

the Navy Board to inſpect the ſhips' books depoſited at their office.

* See Appendix to Part II.

† The mortality of the army in the Weſt Indies is much greater; for it appears by the returns of the War Office, that there died in the year 1780, two thouſand and thirty-ſix ſoldiers, which being calculated by the numbers on the ſtation, and thoſe who arrived in the convoy in March and July, the annual mortality is found to be one in four. The greatneſs of this mortality will appear in a ſtill ſtronger light, when it is conſidered that thoſe who ſerve in the army are the moſt healthy part of the community. When I was on a viſit at the encampment at Coxheath in the year 1779, I was politely favoured with a ſight of the returns, both of the general officers and phyſician, and it appeared that in an army of ten thouſand and eighty-nine men, there died, from the 10th of June to the 2d of November, forty-three, excluſive of twelve who died of ſmall-pox. This being calculated,

rence was partly owing to the general increaſe of health in fleets as a war advances, partly to ſome improvements in victualling, and partly to better accommodations as well as regulations in what related to the care of the ſick.

Though the mortality in fleets in the Weſt Indies is, upon the whole, greater than in Europe, yet it has ſo happened, that, in the late war, the fleet at home has, at particular periods, been conſiderably more ſickly than that in the Weſt Indies was at any one time. I was informed by Dr. Lind, that, when the grand fleet arrived at Portſmouth in November 1779, a tenth part of all the men were ſent to the hoſpital. It appears *, that in the years 1780 and 1781, a period at which the fleet in the Weſt Indies was moſt ſickly, the medium of the numbers on the

calculated, is equal to an annual mortality of one in a hundred and nine; and it was not half ſo much in the encampment of the former year. It appears, by Mr. Simpſon's tables, that the mortality of mankind in England, from the age of twenty to forty-five, which includes the uſual age of thoſe who ſerve in the navy and army, is one in fifty.

* See Table II.

ſick

ſick liſt was one in fifteen, and many of theſe were very ſlight complaints; whereas, in the fleet alluded to in England, the diſeaſes were moſtly fevers, and ſo ill as actually to be ſent to the hoſpital. It appears likewiſe, that there was the greateſt proportion of ſick in our fleet when it was on the coaſt of America in September 1780*. This difference is owing to the greater prevalence of the ſhip fever, and of the ſcurvy, in a cold than in a hot climate.

It has appeared from† our reaſonings concerning the nature of medical inveſtigation, that important practical truths can be aſcertained only by averages expreſſive of the comparative reſults of numerous individual facts. In order, therefore, to illuſtrate ſtill farther the ſubject under conſideration, there is inſerted in the preſent edition of this work, a table of the numbers of admiſſions and deaths at Haſlar and Plymouth hoſpitals for the laſt forty-three years, divided into periods of‡ peace and war.

The

* See Table II. † See Preface.

‡ Although in this account it is reckoned a period of peace from the year 1763 till 1777, both years included, yet

The ſick and wounded of the Navy were firſt received into Haſlar hoſpital in the year 1754, and it was completed about two years afterwards. Plymouth hoſpital began firſt to be occupied in 1760, but was not completed till 1764. It is only ſubſequent to this that the two hoſpitals can be fairly compared, and it is during war that this compariſon ſeems moſt juſt and moſt intereſting, as the caſes are then moſt ſimilar, and it is leſs likely that at that time any caſes will be ſent for cure but ſuch as are fit objects for an hoſpital.

yet there was in that time a conſiderable armament in 1771, in conſequence of a miſunderſtanding with the court of Spain regarding the Falkland Iſlands, and before the commencement of the war with France in 1778, there had been ſmall naval armaments from the beginning of the American diſturbances, for the two or or three preceding years. And though it is reckoned a period of peace from 1783 till 1793, yet in that time, though there was no actual war, there were armaments in 1787, 1790, and 1791, in conſequence of miſunderſtandings with ſeveral foreign powers.

TABLE,

TABLE, ſhewing the Number of Men admitted, and who have died at Haſlar and Plymouth Hoſpitals, from the Year 1755 to the Year 1797, diſtinguiſhed according to the Periods of Peace and War.

	HASLAR.		PLYMOUTH.	
	Received.	Died.	Received.	Died.
* From 1755 till 1763, both years included	34,935	1,869	25,879	1,691
	1. in 18.6		1. in 15.3	
From 1764 till 1777, both years included	31,389	1,004	11,625	454
	1. in 31.2		1. in 25.6	
From 1778 till 1782, both years included	52,503	3,137	27,632	1,109
	1. in 16.7		1. in 24.9	
From 1783 till 1792, both years included	25,065	1,157	25,221	1,309
	1. in 21.6		1. in 19.2	
From 1793 till 1797, both years included.	32,498	2,262	21,277	† 861
	1. in 14.3		1. in 24.7	

It

* The records of the office from which this abſtract has been taken, are wanting from Auguſt 1757 till February 1759, and from May 1761 till April 1762. This, however, does not affect the proportional number of admiſſions and deaths, and the relative ſtate of the two hoſpitals.

† Forty-one deaths reported in the returns of Plymouth for 1796 are not included, being men ſent dead on ſhore for interment from the Amphion frigate, which blew

It appears, then, from the annexed table, that during the late and the preſent wars, there has been leſs mortality at Plymouth than at Haſlar. Theſe two inſtitutions are equally well ſupplied with accommodations, diet, and attendance. They are both kept in a ſtate of the moſt perfect cleanlineſs and good order, ſo that in all points they are juſtly conſidered as models of what hoſpitals ought to be, and are perhaps inferior to none in every advantage attainable by ſuch inſtitutions. It is preſumable, therefore, that the difference of mortality is owing to the difference in point of air. Plymouth has ſome advantage in reſpect to climate, being conſiderably warmer in winter, which is of great advantage to thoſe, more particularly, who are affected with pulmonic complaints, who conſtitute a conſiderable proportion of the ſick. It is alſo ſituated on a drier ſoil. But the chief difference in theſe two hoſpitals conſiſts in the ſize and diſtribution of

blew up while at anchor in the Sound. Thoſe who die on board of their ſhips, both at Portſmouth and Plymouth, are buried at the hoſpitals, and included in the returns of dead; but as all the caſes of danger are uſually ſent to the hoſpitals, the number of thoſe who die on board is uſually but ſmall, and though this affects ſomewhat the general rate of mortality as ſtated above, it does not alter the relative proportion of it at theſe two places.

the

the buildings. Haſlar hoſpital conſiſts of one great center building, and four pavilions running backwards from each corner of it. Theſe are placed in pairs, ſtanding parallel and very cloſe to each other lengthwiſe, ſo as to intercept the free courſe of the air. It is calculated to hold with eaſe eighteen hundred men. Plymouth hoſpital conſiſts of twelve ſeparate ſimilar and equal buildings, ranged in a large ſquare, with wide intervals between each. Of theſe twelve, however, ten only are occupied by the ſick. It is calculated to hold with eaſe twelve hundred men. M. Tenon, a French phyſician, who by his king's order had made a comparative review of moſt of the hoſpitals in Europe, with a view to the reformation of thoſe in Paris, and viſited this one in 1787, gives the preference to it over all others, in regard to the judicious conſtruction and diſtribution of the buildings. The wards in both hoſpitals are nearly of the ſame dimenſions, and there is an allowance of about eight hundred cubic feet for each patient, in the wards where the ſick and wounded are ſo ill as to be confined. Leſs ſpace is allowed for convaleſcent and chronic caſes. The ſuperior ſalubrity of

Plymouth,

Plymouth, therefore, in ſo far as regards the building, ſeems to conſiſt in there being fewer apartments under the ſame roof, ſo that there is a ſmaller maſs of foul air to be carried off, and in the ſeveral buildings not ſcreening each other from the free current of the external air.

It is difficult for thoſe whoſe reſearches and reflections have not led them to conſider this ſubject, to conceive the great influence of even a ſmall difference in the purity of the air, breathed by thoſe who labour under ſickneſs and wounds. This is ſtill more difficult to conceive, when it is obſerved how little theſe varieties affect people in health. One of the moſt ſtriking proofs of this, is the great difference in the ſucceſs of the treatment of compound fractures, and other violent injuries, in private houſes, from what it is at an hoſpital. The ſuperior effect of the air of the country over that of the town, in reſtoring the ſick and convaleſcent, is another fact which ought to be deeply impreſſed on the minds of thoſe who plan edifices and conduct inſtitutions for the reception of the ſick and wounded, in order to ſerve

as an illuſtration of the value of freſh air *.

But the moſt remarkable point of compariſon exhibited in this table, is that of the late war with France, which laſted five years, with the five by-paſt years of the preſent war. It appears that in theſe two hoſpitals alone, there were upwards of twenty-ſeven thouſand more patients admitted in the former than the latter period, though a † greater naval force is now kept up than was ever known in this country, and a greater proportion of it on home ſervice than in the late war. The principal cauſes of this ſeem to be; 1ſt. That the navy at the commencement of this war was manned with leſs impreſſing than on the like occaſions in former wars. The foul air produced by the crowding, and bad accommo-

* See diſeaſes of the army by Sir John Pringle, to whom the world is much indebted for placing this ſubject in a ſtrong and inſtructive point of view, by repreſenting hoſpitals themſelves when ill aired, to be one of the principal cauſes of mortality, and a great ſource of infection.

† The number of ſeamen and marines now voted by parliament is 120,000. The greateſt number in the late war was 100,000, and in the preceding war 88,000.

dation

dation attending the methods of ſecuring impreſſed men, previous to their diſtribution, has already been ſtated as the principal cauſe of the general infection prevailing in the beginning of wars. 2dly, The greater obſervance of cleanlineſs and dryneſs, and the ſtricter enforcement of diſcipline, in conſequence of the conviction now entertained by officers, of the indiſpenſable neceſſity of theſe to the health of the men under their command. 3dly, The general uſe of lemon juice, ſo judiciouſly and liberally allowed to ſhips at ſea for the three laſt years. 4thly, The late increaſe of encouragement to ſurgeons, and the operation of the regulations eſtabliſhed and put in force by the medical board of the navy.

In conſequence of the great diminution of ſick at Haſlar hoſpital, and the general and ſteady ſtate of health of the navy, not only at home but on foreign ſtations, there has juſt now (Auguſt 1798) a reduction been made of one third of the eſtabliſhment there. This is in itſelf a conſiderable ſaving, but the ſaving in the maintenance of the ſick, and replacing thoſe who die or become unſerviceable, is ſtill more conſidera-

ble, not to ſpeak of advantages of ſtill higher moment. And at this criſis, when every one muſt ſee and feel, that our hourly ſecurity, and perhaps our exiſtence, depends on the unremitting exertions and judicious management of our naval force, it cannot but conſtitute the moſt pleaſing matter of contemplation to the nation at large, as well as to the government, and particularly that branch of it which preſides over the navy, to behold at once the great intereſts of humanity, of national defence, and public œconomy thus effectually promoted.

The greater rate of mortality in this than in former wars at both hoſpitals, ſeems chiefly to be owing to the better ſelection of the ſick, more caſes of a ſlighter nature being now cured on board, in conſequence of the additional means afforded to ſurgeons of doing ſo, and, perhaps, a ſtricter attention at hoſpitals reſpecting admiſſions, their general diſcipline having been of late improved.

The two places at which the greateſt number of ſick are put on ſhore, next to theſe two hoſpitals, are Sheerneſs, at the mouth of the river Thames, and Deal, adjoining to the Downs. The latter has for the

the laſt three years been on the eſtabliſhment of a royal hoſpital. The number admitted at the former during the firſt period of war mentioned above, was 4,885, of whom there died 192, that is one in 25.4. and at the latter, 4,982, of whom there died 389, that is one in 12.8. The ſmall proportion of mortality at this time at Sheerneſs, which is one of the moſt unhealthy ſpots in England, and affording very bad accommodations, cannot be accounted for otherwiſe than by the ſlightneſs of the caſes landed at that port at that period. During the five paſt years of the preſent war, there have been admitted at that* place, 3,724, of whom 250 died, or 1 in 14.8; at Deal, 3,396, of whom 170 died, or 1 in 19.9 †.

Thus

* The ſick quarters at this place were aboliſhed a few months before the end of this period, and the ſick have ſince that time been accommodated in an hoſpital ſhip.

† The following is an account of the mortality at ſome of the principal civil hoſpitals. Except that of St. Thomas's, which I extracted myſelf, on an average of the twelve years during which I was one of the phyſicians, this account is extracted from a work entitled "Memoires ſur les Hôpitaux de Paris.—A Paris, 1788." Page 278.

The Royal Infirmary of Edinburgh -	1 in 25
The General Hoſpital at Vienna, fluctuating from - - -	1 in 12. 5
to - - - -	1 in 13. 2

Thus we ſee that the compariſon in point of mortality is greatly in favour of the hoſpitals in England. This is owing to the greater regularity, and the better accommodation and diet, which an hoſpital at home admits of, as well as to the difference of climate. It has alſo been mentioned, that, on moſt occaſions, the hoſpitals I attended abroad were ſo limited as to contain only the worſt caſes, in conſequence of which there would of courſe be a greater proportional mortality than in the great hoſpitals of England.

The following is an account of the whole loſs of lives from diſeaſe, and by the enemy *, in three years and three months, in the fleets and hoſpitals with which I was connected:

Died

* None are comprehended but thoſe who were killed or wounded in battles in which the whole fleet was preſent, this account not including thoſe who fell in ſingle actions in frigates or other ſhips.

Hotel de St. Eſprit, at Rome - -	1 in 11
Hotel de la Chartre at Paris - -	1 in 7
Hotel Dieu at Paris - -	1 in 4.5
N. B. The mortality is ſtill greater if child-bed women and infants are included.	
Hotel Dieu et Rouen - - -	1 in 10
St. Thomas's Hoſpital in London -	1 in 13.5

Died of diſeaſe * -	- 3,200
Killed in battle - -	- 648
Died of wounds - -	- 500
Total †	- 4,348

* It would appear, that, anciently, though the ſlaughter in battle was greater than in modern times, yet that diſeaſe was ſtill more deſtructive than the ſword. One of the oldeſt teſtimonies to this purpoſe is in the Hiſtory of Alexander's Expedition, by Arrian —τους μεν ἐν ταῖς μαχαις ἀπολωλεκασιν, οἱ δε ἐκ των τραυματων ἀπομαχοι γεγενημενοι, οἱ πλειοῦς δὲ νοσω απολωλεσαν. — Arrian. Hiſt. Alex. Exped. Lib. v. cap. 26.

† Upwards of three thouſand were alſo loſt at ſea in ſhips of war belonging to the ſame fleets in the hurricane of October 1780, and in the ſtorm in September 1782, in which the Ville de Paris and the other French prizes were loſt on their paſſage to England.

PART II.

Of the Cauſes of Sickneſs in Fleets, and the Means of Prevention.

INTRODUCTION.

IN the year 1780 I printed a ſmall treatiſe for the uſe of the fleet, containing general rules for the prevention of ſickneſs; and this part of the work is chiefly taken from it.

My own opportunities of experience, as exhibited in the preceding Part, have been ſufficiently extenſive to ſuggeſt many obſervations on this ſubject; but as my object is utility, rather than the praiſe of originality, I ſhall not confine myſelf to theſe. Great part of what is to be advanced is taken from books * and converſation, as well as my own experience, my deſign being to exhibit a conciſe view of all the diſcoveries on this ſubject that have come to my knowledge. I have aſſumed nothing, however, from mere report or teſtimony, having had opportunities, from my own obſervations, of verifying or diſproving the aſſertions of others.

More may be done towards the preſervation of the health and lives of ſeamen than is commonly imagined; and it is a matter not only of humanity and duty, but of intereſt and policy.

* The authors from whom I have borrowed have been chiefly Dr. Lind and Capt. Cook. To the former we are indebted for the moſt accurate obſervations on the health of ſeamen in hot climates, and on the ſcurvy. Of the improvements made by the latter, an excellent compendium may be ſeen in Sir John Pringle's Diſcourſe before the Royal Society, on the occaſion of adjudging a prize medal to Capt. Cook for his paper upon this ſubject in the year 1776.

Towards the forming of a ſeaman a ſort of education is neceſſary, conſiſting in an habitual practice in the exerciſe of his profeſſion from an early period of life; ſo that if our ſtock of mariners ſhould come to be exhauſted or diminiſhed, this would be a loſs that could not be repaired by the moſt flouriſhing ſtate of the public finances; for money would avail nothing to the public defence without a ſufficient number of able and healthy men, who are the real reſources of a ſtate, and the true ſinews of war.

In this view, as well as from the peculiar dependence of Britain on her navy, this order of people is truly ineſtimable; and even conſidering men merely as a commodity, it could be made evident, in an œconomical and political view, independent of moral conſiderations, that the lives and health of men might be preſerved at much leſs expence and trouble than what are neceſſary to repair the ravages of diſeaſe.

It would be endleſs to enumerate the accounts furniſhed by hiſtory of the loſſes and diſappointments to the public ſervice from the prevalence of diſeaſe in fleets. Sir Richard

Richard Hawkins, who lived in the beginning of the laſt century, mentions, that in twenty years he had known of ten thouſand men who had periſhed by the ſcurvy. Commodore Anſon, in the courſe of his voyage of circumnavigation, loſt more than four-fifths of his men chiefly by that diſeaſe. Hiſtory ſupplies us with many inſtances of naval expeditions that have been entirely fruſtrated by the force of diſeaſe alone: that under Count Mansfeldt in 1624; that under the Duke of Buckingham the year after; that under Sir Francis Wheeler in 1693; that to Carthagena in 1741; that of the French under D'Anville in 1746; and that of the ſame nation to Louiſbourg in 1757 *.

* In the late war, ſickneſs alone was not the cauſe of want of ſucceſs in any inſtance, except in the laſt action in the Eaſt Indies, in which ſo many men were ill of the ſcurvy, that there were not hands enow to manage the guns.

There is another fact in hiſtory, which, though not ſo applicable to this ſubject as thoſe above recited, forcibly evinces how important a ſtudy the health of men ought to be in military affairs. When Henry V. was about to invade France, he had an army of fifty thouſand men; but owing to a ſickneſs which aroſe in the army, in conſequence of ſome delays in the embarkation, their number was reduced to ten thouſand at the battle of Agincourt. The diſeaſe of which they chiefly died was the dyſentery.—RAPIN.

That

That the health of a ſhip's company depends in a great meaſure upon means within our power, is ſtrongly evinced by this, that different ſhips in the ſame ſituation of ſervice enjoy very different degrees of health. Every one who has ſerved in a great fleet muſt have remarked, that out of ſhips with the ſame complement of men, who have been the ſame length of time at ſea, and have been victualled and watered in the ſame manner, ſome are extremely ſickly, while others are free from diſeaſe. Is it not naturally to be inferred from hence, that the health of men at ſea depends in a great meaſure upon circumſtances within the power of officers, and, indeed, upon their exertions, much more than medical care *?

It has appeared in the preceding part of this work, that the diſeaſes moſt prevalent among ſeamen are fevers, fluxes, and the ſcurvy. Theſe are indeed ſome of the moſt

* It is not meant by this to inſinuate that every commander is abſolutely accountable for the health of his ſhip's company, and cenſurable when they are ſickly; for this may depend on his predeceſſor in command, or a ſtubborn infection may have prevailed from the original fitting out or manning of the ſhip, which he may not have ſuperintended.

fatal

fatal that can attack the human body; but there is a numerous tribe of complaints, which are alſo ſome of the moſt ſevere ſcourges of human nature, from which they are in a manner entirely exempt.—Theſe are the diſeaſes to which the indolent and luxurious are ſubject, and which ſo far embitter their life as to render their portion of wordly enjoyment nearly on a level with that of the poor and laborious. The diſeaſes alluded to are chiefly the gout, ſtomach complaints, hypochondriac and nervous diſorders. In all countries it is the better ſort of people that are moſt ſubject to theſe; for they are owing to the want of bodily exerciſe, to the great indulgence of the ſenſes, and a greater keenneſs and delicacy in the paſſions and ſentiments of the mind. Man being formed by nature for active life, it is neceſſary to his enjoying health that his muſcular powers ſhould be exerciſed, and that his ſenſes ſhould be habituated to a certain ſtrength of impreſſion. Animal and vegetable nature may be aptly enough compared to each other in this reſpect; for a tree or plant brought up in a greater degree of ſhelter and ſhade than what is ſuitable to its nature, will be puny and ſickly;

ſickly; it will neither attain its natural growth nor ſtrength of fibre, nor will it be able to bear the influence of the weather, nor the natural viciſſitudes of heat and cold to which it may be expoſed.

It is to be remarked, however, that exerciſe and temperance may be carried to exceſs, and that in theſe there is a certain ſalutary medium; for when labour and abſtinence amount to hardſhip, they are equally pernicious as indulgence and indolence. This is ſtrongly exemplified in ſeamen; for, in conſequence of what they undergo, they are in general ſhort lived, and have their conſtitutions worn out ten years before the reſt of the laborious part of mankind. A ſeaman at the age of forty-five, if ſhewn to a perſon not accuſtomed to be among them, would be taken by his looks to be fifty-five, or even on the borders of ſixty*.

The moſt common chronic complaints

* Οὐ γαρ ἐγωγέ τι οἶδα κακώτερον ἄλλο θαλάσσης,
Ανδρά τε συγχεῦαι, εἰ καὶ μάλα καρτερὸς εἴη.
ΟΜΗΡ. ΟΔΥΣ. Θ.
Dire is the ocean, dread in all its forms!
Man muſt decay, when man contends with ſtorms.
POPE.

which

which a long courſe of fatigue, expoſure to the weather, and other hardſhips, tend to bring on, are pulmonary conſumptions, rheumatiſms, and dropſies. It is alſo to be conſidered, that theſe complaints, particularly the laſt, are farther fomented by hard drinking, which is a common vice among this claſs of men, and they are led to indulge in it by the rigorous and irregular courſe of duty incident to their mode of life.

With regard to gout, indigeſtion, hypochondriac complaints, and low ſpirits, there is ſomething in hard labour of every kind that tends to avert them, and particularly in that rough mode of it peculiar to a ſea life. There is alſo ſomething in the harſh ſenſations from the objects which ſeamen are in uſe to ſee, hear, and handle, which ſo modifies their conſtitutions and hardens their nerves as to make them little liable to what may be called the diſeaſes of exceſſive refinement, ſuch as thoſe above mentioned. I have, indeed, met with ſuch diſeaſes at naval hoſpitals; but I always remarked that they were in landſmen who had been preſſed, and who had been bred to ſedentary and indolent occupations.

The

The diſeaſes above enumerated, as well as moſt other chronic complaints, being the offſpring of indolence and luxury, while fevers and feveriſh complaints fall equally on all ranks and deſcriptions of men, it was a ſaying of ſome of the ancients, that acute diſeaſes were inflicted by heaven *; whereas chronic diſeaſes were of man's own creation. But I ſhall endeavour in the courſe of this work to evince, that, with re-

* Wherever cauſes are obſcure, ſuperſtition naturally aſcribes them to ſome preternatural influence; and what ſeemed farther to have encouraged this, anciently, was, that violent epidemics occurred moſt frequently in camps and at ſieges where great political conjunctures were likely to ariſe, in which ſuperior powers were ſuppoſed to intereſt themſelves. Thus we read in Homer of fatal diſeaſes being ſent as puniſhments by the gods. But the peſtilential diſeaſes ſo often mentioned by poets and hiſtorians as prevailing in cities and armies, were probably nothing elſe but fevers, produced partly perhaps by the ſcarcity and bad quality of proviſions, but probably ſtill more by corrupted human effluvia, which was very apt to be produced by the want of perſonal cleanlineſs, to which the mode of cloathing among the ancients would more particularly ſubject them, eſpecially in camps and beſieged towns. The ſea ſcurvy might alſo ſometimes paſs under this name, as it ſometimes is produced by famine, as was the caſe in Paris, and other parts of France, in the year 1699. See Mem. Acad. Scienc.

gard

gard to ſeamen at leaſt, acute diſeaſes are as much artificial as any others, being the offſpring of miſmanagement and neglect; with this difference, that they are imputable not ſo much to the miſconduct of the ſufferers themſelves, as of thoſe under whoſe direction and protection they are placed.

If I were to add any other complaint to the three already mentioned, as moſt prevalent, and peculiar to a ſea life, it would be thoſe foul and incurable ulcers which are ſo apt to ariſe at ſea, particularly in a hot climate. The ſlighteſt ſcratch, or the ſmalleſt pimple, more eſpecially on the lower extremities, is apt to ſpread, and to become an incurable ulcer, ſo as to end in the loſs of a limb. The nature of the diet, and the malignant influence of tropical climates, both conſpire in producing them *.

The

* Though the venereal diſeaſe is leſs frequent in the ſea ſervice than in other ſituations, owing to the opportunities of infection being more rare; yet there is reaſon to think that it may have owed its origin to a ſea life. It is now agreed by thoſe who have fully conſidered the ſubject, that this diſeaſe was not found among the natives of the new world at its firſt diſcovery, for no

ſuch

The diſeaſes moſt frequent and prevalent at ſea have this advantage, that they are more the ſubjects of prevention than moſt others, becauſe they depend upon remote cauſes that are aſſignable, and which increaſe and diminiſh according to certain circumſtances, which are in a great meaſure within our power.

The prevention of diſeaſes is an object as much deſerving our attention as their

ſuch fact is mentioned in the narrative of Columbus or his ſon. But it ſeems probable that Europeans, after making longer voyages than they had ever before been accuſtomed to, and living long upon corrupted and unnatural food, might, under ſuch a peculiar concurrence of circumſtances, engender a new diſeaſe when they return into port, more eſpecially when they came to be connected with the females of a new race of people, ſo different in their conſtitutions and mode of life. This is corroborated by what has happened in our own times in the iſlands of the South Sea, in which this diſeaſe was not known before they were diſcovered, but appeared upon the arrival of the Europeans, though the ſhips crews were declared by the ſurgeons to be free from it. It is alſo contrary to common experience that thoſe forms of the diſeaſe which are infectious, that is to ſay, gonorrhœa and chancres, ſhould exiſt ſo long; for thoſe forms of the diſeaſe in which it exiſts for a great length of time, that is to ſay, ſore throat, blotches, and nodes, are now known not to be infectious.

cure; for the art of phyſic is at beſt but fallible, and ſickneſs, under the beſt medical management, is productive of great inconvenience, and is attended with more or leſs mortality. The means of prevention are alſo more within our power than thoſe of cure; for it is more in human art to remove contagion, to alter a man's food and cloathing, to command what exerciſe he is to uſe and what air he is to breathe, than it is to produce any given change in the internal operations of the body. What we know concerning prevention is alſo more certain and ſatisfactory, in as much as it is eaſier to inveſtigate the external cauſes that affect health, than to develope the ſecret ſprings of the animal œconomy.

This part of the work, therefore, is chiefly addreſſed to thoſe who direct the navy either in a civil or military capacity; for the general health of ſhips depends ſo much upon the victualling and manning in the firſt inſtance, and, afterwards, on the degree of diſcipline and order which are kept up, that I am perſuaded that a certain degree of attention on their part would almoſt

almoſt entirely eradicate diſeaſe from our fleets.

Several remarks in this part of the work will be found ſo obvious, that it might ſeem ſuperfluous to mention them. But it has been my intention to omit nothing that I have heard of or obſerved as a matter of aſcertained utility, and, I believe, the moſt experienced will find either ſomething new, or what they had not before ſufficiently attended to. Though the deſign of it is that of being extenſively uſeful, yet my trouble would be compenſated, ſhould it prove the means of health and comfort to a ſingle ſhip's company; nay, I ſhould not repent my labour, could I enjoy the conſcious certainty of its being the means of ſaving the life of one brave and good man.

The prevention of diſeaſe has relation only to the external cauſes that affect health, and I ſhall conſider theſe under the four heads of

I. AIR,
II. ALIMENT,
III. EXERCISE,
IV. CLOATHING.

CHAP. I.

AIR.

UNDER this head will be conſidered, not only the natural ſtate of the air of the atmoſphere in point of heat and cold, moiſture and dryneſs, purity and corruption, but alſo the different artificial impregnations of it from the holds or other parts of a ſhip, or from the perſons of men who have been neglected in point of cleanlineſs.

The common air of the atmoſphere at ſea is purer than on ſhore, which gives to a ſea life a very great advantage over a life at land. This advantage is ſtill greater in the tropical regions, where the land air, eſpecially ſuch as proceeds from woods and marſhes, is ſo fatal, and where the heat is alſo conſiderably leſs at ſea than on ſhore. But this ſuperior purity of the air at ſea is more than counterbalanced by the artificial means of propagating diſeaſes on board of a ſhip. Since a ſea life, however, has this great natural advantage to health, the cauſes of diſeaſe peculiar to it are chargeable rather

ther to the miſmanagement of men than to any thing unavoidable in nature; and we are from this encouraged to exert our endeavours in removing them,

The effects of land air, however, are not to be neglected by thoſe who are ſtudious of preſerving the health of a ſhip's company, for ſeamen are expoſed to it in various ways while they are in harbour; and this we ſhall treat of, after conſidering the influence of ſimple temperature.

SECT. I.

On the REGULATION of HEAT and COLD.

THAT property of the living body by which it not only generates heat, but maintains it at a fixt point, whatever the external temperature may be, is one of the moſt eſſential and peculiar energies belonging to animal life. While dead matter tends invariably to an equilibrium of temperature with contiguous bodies, the moſt

ſuperficial obſerver muſt have remarked, that in the common courſe of nature, our bodies are conſtantly of a greater degree of heat than the ſurrounding air. It is found, by accurate obſervations on the thermometer, that in health this heat is not only always the ſame in the various degrees of heat below it, but it has been aſcertained, by the obſervations of Governor Ellis*, and the experiments of Dr. Fordyce † and Dr. Blagden, that it remains the ſame even when the external air is of a higher temperature than that of the living body.

As the heat of the body is carried off or retained in various degrees according to that of the ſurrounding medium, and as the generation of heat is one of the moſt material functions of life, it is preſumable, *a priori*, that the efforts which it makes, in thus accommodating itſelf to the various conditions, and the changes, more or leſs ſudden, of the atmoſphere, will have an important influence upon health. This is in fact found to be ſo, for extremes and ſudden changes

* Phil. Tranſ. Vol. L.

† Phil. Tranſ. Vol. LXV.

of

of temperature are hoſtile to health, and there is a certain medium found to be moſt ſalutary and agreeable, which in our climate is about the middle of the range between the freezing point and the heat of the human body. Though deviations, if they are to a conſiderable degree either above or below this, are unpleaſant to the ſenſations, and unfavourable to the functions of life, yet more inconvenience and detriment ariſes from the former than from the latter, as we have it more in our power, by artificial means, to counteract extremes of cold than of heat.

And in conſequence of this principle in the animal œconomy, whereby the ſame temperature is maintained in a living body whatever the external heat may be, it is evident, that the energy by which animal heat is generated muſt vary with the external temperature, and as this, like every other function, goes on beſt when ſubject to ſteady habits, it is rational to preſume, not only that ſudden changes in the heat of the external medium, muſt impoſe a degree of violence and irregular action on the generating power of heat; but that this, not

readily accommodating itſelf to quick extremes, a preternatural accumulation or abſtraction of heat may be expected to take place. Such changes are accordingly found to be unfriendly to health, and are aſcertained by obſervation to be among the moſt frequent cauſes of diſeaſe. Sudden impreſſions of cold are the moſt common occaſional cauſe of all febrile affections, particularly thoſe of the inflammatory kind. Tranſitions the reverſe of this are equally pernicious, and are ſo in proportion to their extent, for the inhabitants of the north of Europe are much more ſubject to the fatal diſeaſes of tropical climates than thoſe of the ſouth of Europe. It is probably owing in part to the ſuddenneſs of the tranſition, in conſequence of the greater quickneſs of the paſſage, that the Weſt Indies is ſo much more fatal to thoſe newly arrived from Europe, than the Eaſt Indies, to which there is a long paſſage through various intermediate climates. The heat in moſt of our tropical ſetlements in the Eaſt, is greater than in thoſe of the Weſt, though the former are much leſs unhealthy.

One

One of the moſt important points in the treatment of the ſick, is to reconcile warmth with ventilation. When artificial warmth cannot be procured, as is frequently the caſe at ſea, a dilemma ariſes whether to run riſks by the excluſion of freſh air, or by the free admiſſion of it. In caſe the prevailing diſeaſes ſhould be thoſe continued fevers which commonly ariſe in ſhips, and depending on infection, there will be moſt riſk from excluding the air; if they ſhould be pulmonic and rheumatick affections, there will be moſt riſk from the free admiſſion of it. There is great room for the exerciſe of judgment and diſcretion in the management of this matter.

The great advantage of fires conſiſts not only in obviating theſe evils, by maintaining a ſalutary and agreeable warmth, but in promoting dryneſs, in exhaling and diſſipating infectious matter, and in procuring a perpetual change of air, by cauſing an aſcent of it in conſequence of rarefaction.

Under this head the influence of the ſunbeams falls to be conſidered. Theſe have no proper heat in themſelves, and produce it

it either by their refraction in paſſing through tranſparent bodies of different denſities, or by impinging on opaque ſubſtances, ſuch as our bodies. It is uſual in regiſters of the weather to overlook the heat ariſing from the direct rays of the ſun, and only to record that in the ſhade. The effect of theſe rays however is very great. I found at ſea in the Weſt Indies, that they raiſed the thermometer fourteen degrees higher than it ſtood in the ſhade or in the ſea, the heat of which is there commonly the ſame with that of the air. They excite heat with greater ſuddenneſs as well as greater intenſity than the air, which is a very bad conductor of heat, and therefore both imparts and abſtracts it very ſlowly. The direct rays of the ſun not only produce that ſudden and fatal affection called the *Coup de Soleil*, but it has been remarked, in the firſt Part of this work, that it is the expoſure to them that is one of the principal cauſes of the very fatal diſeaſes of newly arrived Europeans. There can be no doubt, but that fatigue and intemperance conſpire to the ſame effect, but theſe do not produce the like diſeaſes in temperate or cold climates. It is evident from this, why women are ſo much

much leſs ſubject to the fevers of tropical climates than men. That this is not merely owing to ſomething in the conſtitution peculiar to their ſex, is proved by another ſtriking fact. The priſoners of war who were not under the influence of diſeaſe at their capture, were obſerved to remain exempt from the epidemic fevers of the Weſt Indies. This has been particularly conſpicuous in the years 1794 and 1795, during which the moſt deplorable ravage ever known was made in the great armaments ſent to the Weſt Indies, yet the priſoners of war remained exempt from it, according to the teſtimony of thoſe who had the cuſtody of them at Jamaica and Antigua. There can be no doubt, that the peculiarity of ſituation to which this is principally imputable is ſhelter from the ſun. It is true, the French, particularly thoſe of the ſouthern provinces, are not ſo ſubject as we to the tropical epidemics, and priſoners are not expoſed to fatigue and intemperance; but theſe circumſtances are not adequate to account for the great exemption theſe priſoners enjoyed *.

In

* The ancients had an opinion that nothing was ſo hurtful to health as the direct rays of the ſun. Tacitus has

In the courſe of the ſervice which was the ſubject of the firſt Part of this book, there has been abundant practical proof of the pernicious effects of the direct rays of the ſun, and of the great advantage of * avoiding them as much as poſſible.

SECT. II.

Of the noxious Effects of LAND AIR in particular Situations.

ALL the diſeaſes incident to a fleet, except the ſcurvy, are more apt to ariſe in a harbour than at ſea, and particularly the violent fevers peculiar to hot climates. There

has the following obſervation with reſpect to Rome, when it was rebuilt after the conflagration perpetrated by Nero. Erant tamen qui crederent veterem illam formam ſalubritati magis conduxiſſe quoniam anguſtia itinerum et altitudo tectorum non perinde ſolis vapore perrumperentur. Ut nunc patulam latitudinem et nulla umbra defenſam graviore æſtu ardeſcere. Tacit. Annal. lib. xv. This, however, ſeems to be carrying this principle too far, eſpecially for the climate of Italy, for the harm ariſing from the greater expoſure to heat, would be more than compenſated by the advantage of freer perflation and better ventilation.

* See Page 131.

are

are generally woods and marſhes adjacent to the anchoring places in the Weſt Indies, and the men are expoſed to the bad air proceeding from thence, either in conſequence of the ſhip's riding to leeward of them, or of people's going on ſhore on the duties of wooding and watering, or on military ſervice. Inſtances of this, without number, might be adduced from the accounts of voyages to all the tropical countries. Our fatal expeditions to the Baſtimentos, and to Carthagena, in former wars, are ſtriking proofs of it; and we have ſeen the ſame effects, though in a much leſs degree, while the fleet was at Jamaica in 1782.

I have known a hundred yards in a road make a difference in the health of a ſhip at anchor, by her being under the lee of marſhes in one ſituation, and not in the other *. Where people at land are ſo ſituated,

* If the experiments of modern philoſophy are to be depended on, they go a certain way to account for the unwholeſomeneſs of air from woods in hot climates, and in wet weather; for Dr. Ingenhouſz found that the effluvia of plants in the night time, and in the ſhade, are more poiſonous in hot than in cold weather; but though there is a ſalubrity in the effluvia in ſunſhine (which has ſince

ated, as not to be expoſed to the air of woods and marſhes, but only to the ſea air, they are equally healthy as at ſea. There was a remarkable inſtance of this on a ſmall iſland, called Pigeon Iſland, formerly deſcribed, where forty men were employed in making a battery, and they were there from June to December, which includes the moſt unhealthy time of the year, without a man

ſince been found to be owing to the extrication of oxygene by the decompoſition of water,) yet the intenſity of the heat does not add to this ſalubrity. He found alſo that vegetables, when wet, yield an unwholeſome air.

It is difficult to aſcertain how far the influence of vapours from woods and marſhes extend; but there is reaſon to think that it is to a very ſmall diſtance. When the ſhips watered at Rock Fort, they found that if they anchored cloſe to the ſhore, ſo as to ſmell the land air, the health of the men was affected; but upon removing two cables length, no inconvenience was perceived. I was informed of the following fact, in proof of the ſame, by the medical gentlemen who attended the army in Jamaica: — The garriſon of Fort Auguſta, which ſtands very near ſome marſhes, to which it is to leeward when the land wind blows, was yet remarkably healthy; but it became at one time extremely ſickly upon the breaking in of the ſea in conſequence of a high tide, whereby the water which was retained in the hollows of the fort produced a putrid moiſture in the ſoil, exhaling a vapour offenſive to the ſmell, and with all the noxious effects upon health commonly ariſing from the effluvia of marſhes.

* dying,

dying, and with very little ſickneſs among them, though they worked hard, lived on ſalt proviſions, and had their habitations entirely deſtroyed by the hurricane. During this time near one half of the garriſon of St. Lucia died, though in circumſtances ſimilar in every reſpect, except the air of the place, which blew from woods and marſhes.

The duties of wooding and watering are ſo unwholeſome, that negroes, if poſſible, ſhould be hired to perform them. In general, however, the employing of ſeamen in filling water and cutting wood is unavoidable, but it ſhould be ſo managed as not to allow them, on any account, to ſtay on ſhore all night; for, beſides that the air is then more unwholeſome, men, when aſleep, are more ſuſceptible of any harm, either from the cold or the impurity of air, than when awake and employed. The danger of ſleeping in the Campania of Rome, and on the road from thence to Naples, is a fact well known in Europe, and is farther in proof of what is here advanced.

As the ſervice neceſſarily requires that men ſhould

ſhould be on ſhore more or leſs, however unwholeſome the air may be, means are to be uſed to prevent its pernicious impreſſions on the body. Certain internal medicines, ſuch as bitters, aromatics, and ſmall quantities of vinous liquors, tend to preſerve the body from its bad effects. Of the bitters, Peruvian bark is, perhaps, the beſt; and there is a well-atteſted inſtance of its efficacy in the account given by Mr. Robertſon of a voyage in the Rainbow to the coaſt of Africa; and by the ſame means Count Bonneval and his ſuite eſcaped ſickneſs in the camps in Hungary, while half of the army were cut off by fevers. In conſequence of Mr. Robertſon's repreſentation of the effects, of bark in curing and preventing the fevers of that climate, the ſhips of war fitted out for the coaſt of Guinea have been ſupplied with it gratuitouſly, and Government would find its account in extending this bounty to all the tropical ſtations *.

We have ſeen, in the former part of this work, that the fever produced by the impure air of marſhes may not appear for many days after the noxious principle, whatever it

* It was extended to the Weſt Indies in 1796.

is,

is, has been imbibed; men having been ſometimes ſeized with it more than a week after they had been at ſea. It naturally occurs, therefore, that ſomething may be done in the intermediate time to prevent the effects of this bad air; and nothing is more adviſeable than to take ſome doſes of Peruvian bark, after clearing the bowels by a purgative. Some facts, related in the firſt part of this work, ſhow that an interval of ten days or a fortnight may elapſe between the imbibing of the poiſon and its taking effect. And, in order to guard againſt the diſeaſes of this climate in general, it would be more proper to take ſome large doſes of bark once in either of theſe periods, than to make a conſtant practice of taking a little, as I have known ſome people do, by which they may alſo render their body in ſome meaſure inſenſible to its good effects. I knew a phyſician of ſome eminence in the Weſt Indies, who always enjoyed uninterrupted health, and he imputed it to his taking from half an ounce to an ounce of bark every change and full of the moon, as he thought that fevers of the intermitting and remitting kind, were more apt to occur at theſe periods. Whether this notion be well

founded or not, the practice is proper, upon the other principle that has been mentioned, and the phaſes of the moon will at leaſt ſerve as an aid to the memory.

The ſpices of the country, ſuch as capſicum and ginger, for which nature has given the inhabitants of the torrid zone an appetite, have alſo been found powerful in fortifying the body againſt the influence of noxious air. Either theſe, or the Peruvian bark, or ſimilar ſubſtances, of a bitter and aromatic nature, given in wine, or if there ſhould be none, in ſpirits, to men going upon unwholſome duty, have been found to have a powerful effect in preventing them from catching the fevers of the climate. This may not always be practicable in the hurry of a great fleet upon actual ſervice; but has been found to be of great benefit in the common courſe of ſervice.

But beſides the poiſonous effluvia of woods and marſhes, the ſenſible qualities of the air are alſo to be attended to. If I were required to fix on the circumſtances moſt pernicious to Europeans, particularly thoſe newly arrived in the Weſt Indies, I would ſay

ſay that they are, too much bodily exerciſe in the ſun, and ſleeping in the open air; and the practices moſt hurtful next to theſe are, intemperance in drinking, and bad hours. The ſickneſs and mortality among new comers may, in general, be imputed to ſome one of theſe cauſes.

The laſt direction I ſhall mention with regard to the preſervation of health in a harbour is, that the ſhip ſhould be made to ride with a ſpring on the cable, that the ſide may be turned to the wind, whereby a free ventilation will be produced, and the foul air from the head, which is the moſt offenſive part, will not be carried all over the decks, as it muſt be when the ſhip rides head to wind.

But beſides the obvious and ſenſible qualities of the air above mentioned, there are certain obſcure properties which we do not underſtand, and which we find difficult to inveſtigate; for there are diſeaſes prevailing in certain places which ſeem to depend on ſome latent ſtate of the air. Of this kind is the complaint of the liver, ſo common in the Eaſt Indies, yet almoſt entirely unknown

in the Weſt Indies; and in the Weſt Indies there are certain diſeaſes which prevail in one iſland and not in another; ſuch as the *elephantiaſis* * of Barbadoes, which is an affection of the lymphatics peculiar to that iſland. In the climates of Europe there are alſo certain obſcure conditions of the air that favour one epidemic more than another, and in ſome years more than others †. All this is very myſterious to us; and although we could detect theſe properties of the air, we probably could not prevent their bad effects, ſince man muſt every where breathe the air, whatever its qualities may be.

SECT. III.

Of Foul Air from the Neglect of Cleanlineſs in Men's Perſons — Infection.

Nature has wiſely ſo contrived our ſenſes and inſtincts, that the neglect of cleanlineſs renders a perſon loathſome and offenſive to himſelf and others, thereby guarding againſt thoſe fatal diſeaſes that

* Dr. Hendy has lately publiſhed an ingenious treatiſe upon this diſeaſe.

† See Sydenham's Works.

ariſe from bodily filth. The noxious air we ſpeak of is generated by men keeping the ſame clothes too long in contact with the body, while they are at the ſame time confined and crowded in ſmall and ill-ventilated apartments. Such is the origin of the jail fever, otherwiſe called the ſhip and hoſpital fever; and it ſeems to be with reaſon that Dr. Cullen aſcribes the low, nervous fever of Britain to a ſimilar origin, being cauſed, as he thinks, by an infection of a milder kind ariſing in the clothes and houſes of the poor, who, from ſloth or indigence, neglect to change their linen, and air their houſes. From the general attention that has been paid to the lectures and writings of this eminent profeſſor, this fever has pretty generally obtained the appellation of Typhus.

Man is evidently more ſubject to diſeaſe than any other ſpecies of the animal creation, owing partly to the natural feebleneſs of his frame, but ſtill more perhaps to the artificial modes of life which his reaſon leads him to adopt. Habitations and clothing are abſolutely neceſſary for his ſhelter and warmth, but the abuſe of them is a fer-

tile ſource of diſeaſe, for ſome of the moſt fatal and peſtilential diſeaſes are produced and communicated by them, and we ſee that the greater number of fevers, particularly thoſe of the low and malignant ſort, may be traced to the want of perſonal cleanlineſs, and defective ventilation.

There are few ſubjects more abſtruſe and difficult of inveſtigation than this of infection. The origin of ſpecific contagions, ſuch as the ſmall pox and the venereal diſeaſe, ſeems to be almoſt beyond the reach of a conjecture; and why all the contagions we know, excepting that of the bite of a mad dog, ſhould be confined to one ſpecies of animal, their effects not being communicable to any other, is equally unaccountable. Why is the body incapable of being affected more than once by certain morbid poiſons; and whence comes the ſtriking and curious differences of ſuſceptibility to infection in different individuals at the ſame time, and of the ſame individual at different times?

Moſt ſpecies of contagion are produced by that very diſeaſe which it is itſelf the means of

of exciting*. This is particularly the caſe with what are called the ſpecific contagions. The infection, however, of which we are treating here, is not of this kind, for it may be generated without the previous exiſtence of fever. Some have even doubted whether typhous fever is contagious, and the following fact ſeems, with others ſimilar to it, at firſt ſight to countenance theſe doubts. The fever with which ſo many members of

* Whoever reflects deeply on this fact, will perceive that it is one of the moſt abſtruſe and unaccountable in the natural hiſtory of animal life, as well as one of the moſt diſtinguiſhing characteriſtics of animal nature. For why ſhould a ſpecies of matter, produced by a certain morbid action, be itſelf the means of exciting that action in another perſon? It will be difficult to find any thing in the general analogy of nature to connect theſe two facts. In another view, it ſeems repugnant to the analogy of nature, and to the beneficent intentions diſplayed in the creation, that ſhe ſhould inſtitute a law deſtructive of her own work, and ſubverſive of the welfare and exiſtence of living beings. It may, however, be inferred *a priori*, that this, like every other inſtance of phyſical evil in the univerſe, reſults from the operation of ſome general law, of which it is the neceſſary and remote effect; and there ſeems to be ſome ſimilitude between this and the functions of digeſtion, ſecretion, and generation, the ſame general law of aſſimilation ſeeming to apply to them all. But our views upon this ſubject are too obſcure to ground any ſatisfactory reaſoning upon them.

the court were affected at the ſeſſions of the Old Bailey in the year 1750, though it was derived from priſoners, could not with propriety be ſaid to be communicated by them, for they themſelves did not labour under it. Neither did it ſpread beyond thoſe who were in the firſt inſtance affected by it; for though it was ſo violent and fatal, none of the members of their families, nor any of thoſe who attended them in their illneſs, caught the diſeaſe; ſo that not being propagated it happily became immediately extinct.

It can only however be inferred from this, that the ſtate of the air, and other circumſtances neceſſary to render contagion active, were not then preſent. If men labouring under a ſimilar fever are brought from a ſhip or elſewhere to an hoſpital, where they are ſtripped and waſhed, there will indeed be little riſk of their infecting others; yet there are ſo many inſtances of the attendants at naval hoſpitals catching this fever, though all adhering infection had been removed by virtue of the excellent regulations eſtabliſhed there, that no doubt can remain of the fever being in itſelf infectious.

Doubts

Doubts have alſo ariſen concerning the infectious nature of the yellow fever of the Weſt Indies, the peſtilential fever of 1792, in Philadelphia, and even of the plague * it-

* The ancients aſcribed the prevalence of epidemic diſeaſes in armies and cities to the anger of the gods, which may be a reaſon why there is no mention of infection among ſome of the early writers in phyſic. I have not been able to meet with any alluſion to infection in the works of Hippocrates, Celſus, Aretæus, or Trallian. Thucidydes, however, in his account of the plague at Athens, has an evident alluſion to it. In the works of Galen there is clear evidence of his belief in the exiſtence of it. He ſays, it is a fact ſo obvious, that no one can doubt of it; and it may be ſaid, that the ancient authors who have not mentioned it conceived it to be ſo ſelf evident, as not to require to be formally enunciated. But this is hardly credible in a matter ſo intereſting to mankind, and as prevention is one of the moſt important branches of practical medicine, the conſideration of it muſt be conſtantly recurring to thoſe who treat of it. Whatever may be alledged with regard to others, this cannot be affirmed of Celſus, who has a chapter on the rules for avoiding the plague, where no mention is made of contagion, and he aſſigns certain winds as the cauſe of it. But what is ſtill more aſtoniſhing, certain French writers, who have given an account of the plague of Marſeilles in 1720, have attempted to prove, that it is not contagious; and Dr. Stoll of Vienna, as late as the year 1770, has profeſſed the ſame opinion. Nemo ægrotus quidquam ſomniat tam infandum, quod non aliquis dicat philoſophus.—VARRON. Fragment. This queſtion is treated with great preciſion by Dr. Ruſſel, in his Treatiſe on the Plague.

ſelf,

ſelf. Theſe doubts ſeem to have taken their riſe from its having been obſerved, not only that no contagion whatever * infallibly affects all who are expoſed to it, but that there are circumſtances in which the moſt active and violent contagion has no effect. In order that any perſon ſhould catch an infectious diſorder, not only a certain prediſpoſition of the conſtitution is neceſſary, but a concurrence of certain external circumſtances, ſuch as the manner of life, the ſtate of the air in reſpect to heat, purity, humidity, † motion, and probably certain unknown conditions of it, that favour particular epidemics. When we reflect that there are ſo many requiſites, each of which may be a *ſine qua non* in giving effect to infectious matter, we can in ſome meaſure account for the ambiguity that has ariſen with reſpect to the exiſtence of infection in particular inſtances: and as a proof that the moſt violent infection loſes

* This is deducible from familiar facts with regard to the ſmall-pox, and other contagious diſeaſes; and in the plague which prevailed, in 1720, at Marſeilles, a city containing 90,000 inhabitants, between 70 and 80,000 were taken ill, of whom 40,000 died, ſo that from 10 to 20,000 were not affected.

† See the effect of ſtagnation of the air, page 25, in the note.

its

its effect, even in its moſt accumulated ſtate, we have only to advert to a well known fact in the hiſtory of the plagues which for ſo many ages afflicted England, that this diſeaſe did not prevail as an epidemic except from the end of June till the beginning of November, and was as its height in September. If the effect depended on contagion ſimply, it is manifeſt, that it could not have ſpontaneouſly diſappeared while it was ſo immenſely multiplied and ſo generally diffuſed. In the South of Europe, and in the Levant, the plague prevails in the ſpring months, which correſpond in the degree of heat with the ſeaſon that has been mentioned in England. * Dr. Ruſſel relates, that the infectious matter of the plague will adhere to particular apartments for ſeveral years ſucceſſively, but will not exert its influence on the inhabitant except at the return of the uſual ſeaſon for its appearance.

The infection of fever differs from the ſpecific morbid poiſons: firſt, in its not depending in all inſtances on the diſeaſe itſelf, the common ſource of it being the ſtagnated

* Treatiſe on the Plague, page 244.

effluvia

effluvia of the human body, from the want of a change of linen, while there is at the ſame time an excluſion of freſh air. Theſe are the circumſtances which concur to produce febrile infection in jails, ill-regulated hoſpitals, and ill-diſciplined ſhips. 2dly, This infection may exiſt about the perſons of men without producing the diſeaſe. This happens to thoſe about whoſe perſons it was generated. 3dly, It may be caught more than once in life.

In order, therefore, to preſerve the crews of ſhips from ſuch diſeaſes, means ſhould be taken not only to prevent the introduction of infection already exiſting, but to prevent the generation of it on board.

1. Means of preventing the introduction of Infection.

WAR is a ſtate of violence and confuſion, in which the hurry and emergency of ſervice may be ſuch as to render it impoſſible to put in practice all the rules which might be laid down concerning the preſervation of health, yet it is neceſſary that thoſe who direct the navy, either in a civil or military capacity,

capacity, ſhould be aware of the cauſes of ſickneſs and mortality, in order to guard againſt them as far as is practicable. From an indolent acquieſcence in this belief of the hardſhips and inconveniencies of war being unavoidable, I have known neglect to ariſe in the conduct of officers with regard to thoſe under their command, as if it was not the duty of a commander to employ his utmoſt attention to alleviate the misfortunes and mitigate the ſufferings of his fellow-creatures; and we have ſeen that much more of the calamities of war ariſe from diſeaſe than from the ſword. The like excuſe might be framed for the neglect of ſtores and arms, which the hurry of ſervice might equally expoſe to injury. We ſee, indeed, infinite pains taken to prevent cordage from rotting, and arms from ruſting; but however precious theſe may be as the neceſſary implements of war, it will not be diſputed that human hands are ſtill more ſo; yet, though there is the additional inducement of humanity to watch over the health of men, I do not think that this, in general, is ſtudied with a degree of attention equal to what is beſtowed on ſome inanimate objects.

Ships

Ships of war are expoſed to infection chiefly by receiving ſuch men as have been raiſed by preſſing, who are frequently confined in guardſhips, under ſuch circumſtances of bad air and bodily filth as tend to generate the moſt virulent infection. The ſervice alſo requires ſometimes that men be received from jails, and they are either criminals delivered over by the civil juriſdiction of the country, or captives who have been reſtored by the enemy after a courſe of confinement in their priſons. It may happen too, as we have ſeen *, that men who are made priſoners of war at ſea, may have infection about them, and will communicate it the more readily that they are ſtrangers.

Infection, like ſome other poiſons, does not ſo readily affect thoſe who are accuſtomed to it, and therefore thoſe who are in the habit of being expoſed to it, frequently eſcape its bad effects, eſpecially if it is gradually applied, as muſt be the caſe with thoſe about whoſe perſons it is generated. For the like reaſon, phyſicians and nurſes are leſs ſuſceptible than others; and ſtrangers, who are accuſtomed to a pure air, are the moſt

* See Part I. Book II. Chap. VI.

ſuſceptible

ſuſceptible of any. It is obſerved by * Dr. Short, that contagious epidemics are more frequent and fatal in the country than in London, and this may probably be accounted for on the ſame principle; for every perſon in a great town is expoſed to the breath and effluvia of others, and to a variety of putrid exhalations, which are unavoidable where multitudes inhabit together; but they are ſo uſed to them, that they are not affected by them; whereas in the country, where people are leſs accuſtomed to each other's company, and leſs uſed to impure air in general, they are the more readily affected when infection is introduced among them. It may even admit of a doubt if any ſociety of men, living together, are entirely free from morbid contagion. It certainly ſometimes happens, that a ſhip, with a long-eſtabliſhed crew, ſhall be very healthy; yet, if ſtrangers are introduced among them, who are alſo healthy, ſickneſs will be mutually produced. This principle in the human conſtitution, by which the preſence of ſtrangers affects it, is well illuſtrated by a fact †,

* See Comparative Hiſtory of the Increaſe and Decreaſe of Mankind.—Quarto, London, 1767, p. 52.

† See Martin's Hiſtory of the Weſtern Iſlands, and Medical Communications, Vol. I. page 68.

founded

founded on the beſt teſtimony, that, in one of the ſmall weſtern iſlands of Scotland, which is ſo remote, that the inhabitants are frequently without any communication with ſtrangers for ſeveral months together; they become ſo ſuſceptible, in conſequence of this long interruption of intercourſe, that they are ſeized with a catarrh when ſtrangers of any deſcription come among them. It was ſaid before, that cleanlineſs was founded on a natural averſion to what is unſeemly and offenſive in the perſons of others; and there ſeems alſo to be implanted in human nature, for the ſame purpoſe, an inſtinctive horror at ſtrangers, as is viſible in young children and uncultivated people. In the early ages of Rome, one word ſignified both a ſtranger and an enemy.

Theſe obſervations naturally ſuggeſt ſeveral uſeful and practical remarks. It would appear that the utmoſt attention is neceſſary not only to guard againſt the actual preſence of diſeaſe, but to be jealous of all new draughts of men, eſpecially if they ſhould come from guardſhips, jails, tenders, or the priſons of the enemy, and have been turned over from ſhips where

diſeaſe

diſeaſe is known to have prevailed; nay, that it is beſt to avoid mixtures of any kind.

The infection of fevers ſeems different from moſt others in this, that it is very various in its degrees of virulence. There is reaſon to think that the poiſon of the ſmall pox, and that of the venereal diſeaſe, are in their own nature invariable, and that the difference of theſe diſeaſes, in point of malignancy, depends on the conſtitution and other circumſtances of thoſe affected; whereas that of fevers being of different degrees of activity, and being frequently obſcure and latent, is, on that account, the more treacherous, and ought to be watched with the greater circumſpection.

The mode of manning the navy by preſſing, I take it for granted, is unavoidable; at any rate, it would not become me to arraign a practice which has had the public ſanction for ages. It is, however, one of the principal means both of generating and ſpreading the ſeeds of diſeaſe, in conſequence of the indiſcriminate ſeizure of men for the public ſervice, and the confinement that is neceſſary to ſecure them. And as the exigences

of the ſervice make it neceſſary to admit perſons of every deſcription, there is no other remedy for this evil but to annihilate, if poſſible, the contagion that may thus be conveyed into ſhips of war. This is done by ſtripping and waſhing the new recruits who may be ſuſpected of importing infection; alſo by cutting off their hair, clothing them with new clothes, and deſtroying, or baking and fumigating, the old, before they are allowed to mix with the ſhip's company in which they are to enter.

Thoſe who have put theſe methods ſtrictly in practice, have been ſenſible of their great utility; and the moſt exact attention is neceſſary, as a ſingle infected man, or even any part of his clothing, may ſpread ſickneſs through a whole ſhip's company. When we reflect what havock an infectious fever ſometimes makes in a ſhip, it will appear how very important this ſort of attention is; and when the cauſe of the ſicklineſs of particular ſhips is traced to its ſource, it will generally be found to have originated from taking on board infected men at Spithead, or wherever elſe the ſhip's company may have been completed.

After

After the firſt edition of this part of the work was printed, an excellent inſtitution was eſtabliſhed at Portſmouth for the prevention of infection. A ſhip was appointed for the reception of the recruits of the fleet, to which they were carried, to be ſtripped, waſhed, and provided with new apparel, before they joined their reſpective ſhips *. This had a viſible good effect on the health of the fleet; and it was planned and executed by Sir Charles Middleton, Comptroller of the Navy, whoſe unwearied aſſiduity, as well as integrity and ability in that important poſt, claim the higheſt praiſe and gratitude from his country.

It follows farther, from the preceding obſervations, that there is a degree of riſque in mixing two different ſorts of men, even when there is no actual diſeaſe or ſuſpicion of infection; for, whether it is from dormant infection, or merely from the circum-

* There uſed formerly to be great ſickneſs and mortality among the convicts in the hulks at Woolwich, but for the laſt five years, in conſequence of a regular ſyſtem of precaution being eſtabliſhed, by ſtripping, waſhing, and new clothing the felons newly arrived from jails, the infectious fever has hardly been known, and there has been no inſtance of it the laſt two years.—(September, 1798.)

ſtance of change of air, ſuch mixtures are known from experience to be ſometimes productive of ſickneſs. The late Admiral Boſcawen was ſo ſenſible of this, that he avoided it, unleſs when ſome evident utility or neceſſity of ſervice made it proper; and upon this principle he uſed to reſiſt the ſolicitations of captains when they requeſted to carry men from one ſhip to another upon changing their command.

One probable reaſon, among others, for ſhips of the line being more ſickly than frigates or ſmaller ſhips is, that in greater numbers there is a greater chance of men of various deſcriptions and modes of life being mixed together.

2. Means of preventing the Production of Infection.

THE infection of fever is not always imported from without, but may be originally and ſpontaneouſly generated on board. The cauſes of this, as mentioned before, are want of perſonal cleanlineſs, and alſo confinement and crowding in cloſe apartments.

Among brute animals, as well as the human ſpecies, acute infectious diſtempers are generated by their being confined together in

in numbers, in ill ventilated places. A complaint of this kind is common in dog-kennels, and alſo among ſheep, where they are houſed during the winter, or when too much crowded on board of ſhips. The glanders in horſes is little known but in large ſtables, where the air is not freely admitted. Birds in aviaries are alſo ſubject to a peculiar diſeaſe.

In order to promote cleanlineſs, care ſhould be taken that every man, on his firſt entering into the ſervice, be provided with a proper change of linen, and that a frequent muſter and review be made, in order to inſpect their perſons, and to examine their ſtock of apparel. A true ſeaman is in general cleanly, but the greater part of men in a ſhip of war require a degree of compulſion to make them ſo; and ſuch is the depravity of many, that it is common enough for them to diſpoſe of their clothes for money to purchaſe ſpirituous liquors. A muſter and review, therefore, wherein men ſhould be obliged once in the week to preſent themſelves clean before their officers, and to produce a certain neceſſary quantity of clean apparel, would conduce both to ſobriety and cleanlineſs. The exertion of

authority, and the infliction of merited punishment, is so far from being considered by the men as a hardship, that they expect it; and it is the duty of an officer, as it is of a parent to a child, to constrain those entrusted to his care to conform to what is for their good. It is common also for men to lay up their clothes in a wet and unwashed state, which in time is productive of the most offensive and unwholesome vapours; and this can be prevented only by their chests and bags being frequently inspected by their superiors.

It must be evident to any one who reflects on this subject, that a regulation of this kind is as necessary as any other part of duty; and it deserves to be made an article in the public instructions, instead of being left to the discretion of officers. This sort of discipline is particularly necessary in ships of the line, in which one cause of the greater unhealthiness is the difficulty of taking cognizance of so great a number; for, unless some regular method, as by muster, is established, there will be men who will escape notice, and skulk below, indulging in laziness and filth.

The good ſenſe and humanity of many captains in the late war, led them to adopt methodical regulations of this kind for the preſervation of cleanlineſs and order. The only public ſanction given to this ſort of diſcipline, was that of Lord Howe, who gave it in orders to thoſe under his command, that each ſhip's company ſhould be divided into as many diviſions as there were lieutenants, and that theſe ſhould be divided into ſquads, with a midſhipman appointed to each; and that the officers ſhould be reſpectively reſponſible for the good order and diſcipline of the men aſſigned to them.

It is an excellent cuſtom, and pretty general in the navy, to allow the men one day in the week for waſhing, when the weather and other circumſtances will admit of it. It would be a farther improvement in the rules of the ſervice, to ſupply ſope in the ſame manner as tobacco and ſlops are ſupplied, that is, to let the men have what quantity they want from the purſer, who is allowed to charge it againſt their wages *.

The

* In the year 1796, I ſuggeſted to that excellent and celebrated officer Lord St. Vincent's, while he commanded the fleet in the Mediterranean, an application

The circumſtances which generally conſpire with want of cleanlineſs in producing morbid effluvia, are crowding, and want of ventilation. There is reaſon, however, to believe, that the firſt alone will have that effect, for there is the peculiar fœtor belonging to infection about the perſons of common beggars, and others who do not change their linen for a great length of time, though living in the open air as much as other people. Cloſeneſs and crowding, however, generally concur with it on board of ſhips. A certain length of time is neceſſary, in order that theſe ſhould have this effect, and the longer they take place, the more certainly will infection be produced, and it will be the more virulent *.

In

on his part to the board of Admiralty for a ſupply of ſope to the crews of the ſhips under his command, either gratuitous, or by a ſtoppage in their wages. As his zeal is equal to his knowledge in all branches of naval duty, and as this propoſal concurred with his own judgment, he made the application with ſucceſs, and there has been a general order ever ſince for ſope being ſupplied on the latter footing.

* At the time I am writing this, (March 8th, 1785) there has occurred a fact which proves the effect of time in generating infection. There now prevails a contagious fever in ſeveral of the hoſpitals in London, and, among

In order to admit air freely, the ports ſhould be kept open whenever the weather will permit this to be done. The great objection to free ventilation is the danger of expoſing

among others, in that to which I am phyſician. In another hoſpital it has been ſo violent, that there has been a vulgar report that the plague had broke out in it. The ſame fever alſo prevails among the poor at their own houſes. The cauſe of it ſeems to be, that the cold weather has been uncommonly long and ſevere; for the froſt began early in December, and the cold has hitherto been more like that of winter than ſpring. The thermometer all this month has varied from 30° to 35°. Cold is favourable to infection, by preventing ventilation; for people exclude the air in order to keep themſelves warm, and the poor in particular do ſo on account of their bad clothing, and their not being able to afford fuel to make good fires. The mortality in the Hotel Dieu of Paris was greatly increaſed in the cold winter of 1740, viz. from 1 in $4\frac{1}{2}$ to 1 in $3\frac{1}{2}$. The fever among lying-in women in that hoſpital does not ſhew itſelf with great fatality except in winter, and in that ſeaſon much more than one half of the women uſually die. (See the work of M. Tenon, formerly quoted.) It appears by the bills of mortality of London, that the general mortality was much increaſed in 1740, and alſo in 1741, in which the winter was likewiſe uncommonly ſevere. This, however, ſeemed chiefly owing to the effect of cold upon pulmonic and aged people. Since the firſt edition of this work, there has been another proof of the effect of cloſe apartments and cold in creating infection, in a paper by Sir George Baker, in the third volume of the

expoſing men to the air in cold climates. But it fortunately happens, that fire, while it is the moſt effectual means of counteracting the cold air, is alſo the beſt means of promoting

the Tranſactions of the college of Phyſicians. It has already been ſtated how conducive heat is to prevent and extinguiſh infection by producing a change of air; and with this view, a chimney is of great uſe, even though no fire ſhould be kept in it, as it ſerves for a ventilator. But if an aperture were to be made in an apartment merely with a view to ventilation, it ſhould be placed in that part of the wall next the ceiling; for foul air naturally tends upwards, and the external air entering at the top of a room, would not be ſo apt to ſubject thoſe within to the effect of cold, as it would not blow directly upon them. I was for ſome time at a loſs to account for the degree of health enjoyed by the poor in London who live below ground, and for the air being ſweeter there than in the habitations of the ſame claſs of people in garrets. This will eaſily be underſtood, when it is conſidered that in the former the communication with the open air is upwards. The ſame circumſtance accounts for the ſuperior ſweetneſs of the air in a ſhip, to that of an apartment in a houſe of the ſame dimenſions, for there is a perpetual exit for the foul air by the hatchways. And it is for this reaſon that more ſick may be accommodated in an hoſpital ſhip without producing foul air, than could be ſafe or proper in the ſame cubic ſpace in the apartments of a houſe. It is upon the ſame principle that the air-trunks proceeding from the ceiling of a room, or from the deck over head in a ſhip, prove ſuch powerful means of ventilation. Theſe trunks are preferable to openings made immediately into the open air, even though they ſhould

promoting ventilation; for wherever there is fire, there is a conſtant change of air taking place by means of the draught to which it gives occaſion. This cannot be done with ſafety and convenience in all parts of the ſhip; but frequent fires in the lower parts of a ſhip will prove extremely ſalutary, by drying up the moiſture, and producing a change of air, and alſo in a cold climate by the warmth it produces.

ſhould be cloſe to the ceiling or deck, for the wind oppoſes the iſſue of the foul air, whereas the draught is perpetually upwards in the trunk. The air below aſcends from its being warmer, and from this ſpecies of foul air being ſpecifically lighter than common air. For the ſame reaſon apartments with high cielings are favourable to the retention and production of contagion, unleſs there are apertures in the upper part of them, where the bad air would otherwiſe ſettle and ſtagnate. This precaution is particularly neceſſary in great manufactures. There would be this farther advantage in jails from apertures near the ceiling, that they would not be ſo liable to be forced for the purpoſe of eſcape as if they were nearer the floor; and in hoſpitals they would be out of reach of thoſe who, wiſhing to indulge in warmth at the expence of pure air, might be induced to ſhut the windows. But an external communication with the air any where is of the utmoſt importance; and it is obſervable, in Mr. Howard's account of priſons, that the jail diſtemper was moſt frequently to be met with where there was no chimney.

The

The hammocks and bedding ſhould alſo be aired by expoſing them upon deck, eſpecially after the ports have been long ſhut in conſequence of bad weather. They cannot be thoroughly aired unleſs they are unlaſhed; and as this could not be conveniently done daily in men of war, it might be done from time to time by the different diviſions in rotation *. When the men come to ſleep upon them after theſe operations, they experience the ſame agreeable ſenſations as from a change of linen; and this muſt conduce to health as well as pleaſure, like all other natural and moderate gratifications. It may be farther remarked in favour of cleanlineſs, that it is not only directly conducive to health, but is naturally connected with habits of good order, ſobriety, and other virtues. The moſt cleanly men are always the moſt decent and honeſt, and the moſt ſlovenly and dirty are the moſt vicious and irregular.

A ſhip of war muſt have a much greater number of men on board than what are ne-

* It is of ſome conſequence to attend to the materials of the ſeamen's beds; for, inſtead of flock, they are frequently ſtuffed with chopped rags, which, conſiſting of old clothes, emit a diſagreeable ſmell, and may even contain infection.

ceſſary

ceſſary to navigate her; for, beſides the marines, a great many hands are neceſſary to man the great guns in time of action. For this reaſon, there is a greater riſque of the inconveniences of overcrowding than in ſhips intended for commerce, and therefore much greater attention is neceſſary with regard to ventilation and cleanlineſs. There is a piece of management which tends alſo in ſome meaſure to obviate the neceſſity of crowding: This is to berth the watches alternately, by which it is meant, that one half of each watch ſhould lie on different ſides, whereby they do not ſleep ſo cloſe, and are not ſo much expoſed to each other's breath, and to the heat and effluvia of each other's bodies. This has the farther advantage of preſerving the trim of the ſhip.

What has been ſaid of the ſhip and men in general, applies ſtill more ſtrongly to the ſick, and the berth * aſſigned to them; for there is nothing ſo apt to increaſe, and even to generate, contagion, as a number of ſick together, unleſs uncommon attention is paid to cleanlineſs and ventilation. This is

* By a berth is underſtood the interval between two guns, or any ſpace between decks, which is ſometimes formed into a ſort of apartment by means of a partition made of canvaſs.

ſo

ſo true, that, unleſs where the complaint is very catching, it is beſt not to ſeparate the ſick; for if there is a good ſet of men on board, thoſe who are confined by ſickneſs will be better nurſed and tended by their meſſmates than in a ſick berth. But if the ſtate of infection renders ſeparation neceſſary, the beſt part for the accommodation of the ſick, in a ſhip of the line, is under the forecaſtle in a warm climate, and on the fore part of the main deck in a cold one. When they are under the forecaſtle, however, they ought to occupy only one ſide, as they would otherwiſe be diſturbed by the men who muſt paſs to and from the head, and the men in health would, in this caſe, be expoſed alſo to contagion. As infection is moſt likely to ariſe among the ſick, attention to cleanlineſs and air is doubly requiſite where they lie. It is by many thought ſalutary, as well as agreeable, to diffuſe the ſteams of vinegar among the ſick; but it ſeems beſt to avoid all fumigations unleſs infection actually exiſts, or there are ſtrong ſuſpicions of it, for theſe practices may be deemed of ſuch efficacy as to ſuperſede the vigilance and attention neceſſary to maintain cleanlineſs, dryneſs, and ventilation, which ought

ought to be the objects of unremitting ſtudy.

Thus we ſee that cleanlineſs and diſcipline are the indiſpenſable and fundamental means of health, without which every other advantage and precaution is thrown away. Government never beſtowed more attention and expence upon the victualling of the navy than during the late war; but it would be to little purpoſe to provide the moſt nouriſhing and antiſcorbutic diet, the moſt wholeſome and cordial wines, the moſt efficacious remedies, and the moſt ſkilful phyſicians and ſurgeons, if the men are not conſtrained to keep their perſons ſweet, their clothing and bedding clean, and their berths airy and dry. It is, therefore, upon officers more than any others that the health of the fleet depends; and I ſhould be excuſed in the frequent mention I make of this, were it known how often I have been the witneſs of the fatal effects of the neglect of theſe rules.

3. Means of eradicating Infection.

WHEN, from a neglect of the means above mentioned, an infectious fever comes actually

actually to prevail, and the infection, perhaps, adheres obſtinately to the ſhip in ſpite of cleanlineſs, good air, good diet, and all the other means, which, if employed in due time, would have prevented it, then ſome meaſures are to be taken for eradicating this ſubtile poiſon.

The firſt ſtep towards this is, to prevent the diſeaſe from ſpreading, and this is done by ſeparating the ſick from the healthy, and cutting off all intercourſe as much as poſſible. For this end, it is neceſſary to appropriate a particular berth to contagious complaints, and not only to prevent the idle viſits of men in health, but to diſcover and ſeparate the perſons affected with ſuch complaints as ſoon as poſſible, both to prevent them from being caught by others, and becauſe recent complaints are moſt manageable and curable. Officers might be very uſeful in making an early diſcovery of complaints, by obſerving thoſe who droop and look ill in the courſe of duty; for ſeamen think it unmanly to complain, and have an averſion to be put on the ſick liſt. I have heard of a method practiſed in ſome ſhips, of keeping a book

on

on the quarter deck for the officer to mark the names of ſuch men as might look ill, or might be miſſed from duty upon calling the roll, in order to afford the ſurgeon a means of finding out thoſe who ſhould be the objects of his care.

Thoſe whoſe profeſſion it is to ſuperintend the health of the ſhip, would find it for their eaſe and intereſt, and ſhould conſider it as their duty, to walk over the different decks once a day, or every other day, in order to make an early diſcovery of thoſe who may be taken ill *. Though I have laid as

* Since the laſt edition of this work, new inſtructions for navy ſurgeons have been drawn up and iſſued, upon that branch of ſervice being transferred in 1796, from the Navy Board to the Commiſſioners of Sick and Wounded Seamen, who may now be properly called The Medical Board of the Navy. The following is one of the articles, "As it is of the utmoſt importance that proper means of cure ſhould be employed at as early a ſtage as poſſible, of the ſeveral diſeaſes to which the men are ſubject, and as ſeamen are naturally careleſs of their own welfare and averſe to complain, you will, as often as you perceive any of the ſhip's company, who by their appearance give indications of illneſs, examine them, and put them on the ſick liſt if neceſſary, that no time may be loſt in ſtopping the progreſs of diſeaſe. And upon long cruiſes and voyages, when there is not a ſufficiency of lemon-juice for the whole number of men on

as great ſtreſs on the duty of the commander, as the proper guardian of health, yet his aſſiduity will not avail unleſs the ſurgeon alſo does his part, by ſuch acts of attention as I have mentioned, joined to ſkill in his profeſſion.

In order to prevent ſickneſs from ſpreading, it is not ſufficient to cut off all perſonal intercourſe. The clothes of men are as dangerous a vehicle of infection as their perſons; and it ſhould be a ſtrict and invariable rule in caſe of death from fever, flux, or ſmall pox, to throw overboard with the body every article of clothing and bedding belonging to it.

Upon the ſame principle, in caſe of recovery from any contagious diſeaſe, as it would be too great a waſte to deſtroy the

board, you will alſo, with the captain's leave, take a view of the ſhip's company from time to time, and examine whether any of them have obſcure ſymptoms of ſcurvy, too ſlight to make it neceſſary for them to withdraw from duty and be put on the ſick liſt; and you will alſo enquire what men have been longeſt on ſalt proviſions; and making a liſt of ſuch men you will preſent it to the captain, in order that he may give directions for ſuch men being ſupplied with the uſual allowance of lemon-juice and ſugar, put in the purſer's cuſtody for that purpoſe."

clothes and beds, they ſhould be ſmoked, and then ſcrubbed or waſhed before the men join their meſſes and return to duty. This precaution is the more neceſſary, as infection in a ſhip is extremely apt to be communicated by bedding, from the cuſtom of ſtowing the hammocks in the netting, by which they are brought in contact with each other. This, however, is an excellent cuſtom, as it not only clears the ſhip below, and ſerves to form a barricade on the gunwale, but tends to air the bedding; and this ſalutary effect ſhould not be prevented, except in caſe of rain, by the coverings, called hammock-cloths, by the uſe of which utility is evidently ſacrificed to an exceſs of neatneſs.

It ſometimes happens that the number of ſick in a ſhip is ſo great, that it is not poſſible to take proper and effectual meaſures on board for ſtopping the progreſs of diſeaſe *. But

* Since the laſt edition of this work was publiſhed, a mode of fumigating has been brought into uſe on the ſuggeſtion of † Dr. Carmichael Smith, the peculiar ad-

† See a work entitled a Deſcription of the Jail Diſtemper, as it appeared among the Spaniſh priſoners at Wincheſter, &c.—London, 1795.

But when ſhe can be cleared of the ſick by ſending them to an hoſpital, no pains ſhould be ſpared to extirpate the remaining ſeeds of infection.

For this purpoſe, let their clothing and bedding be ſent along with them; let their hammocks, utenſils, and whatever elſe they leave behind, be ſmoked, and either ſcrubbed or waſhed before they are uſed by other men, or mixed with the ſhip's ſtores; let the decks, ſides, and beams of their berths, be well waſhed, ſcraped, ſmoked, and dried

vantage of which over charcoal and ſulphur is, that it can be put in practice in the midſt of the ſick. It conſiſts in pouring ſtrong vitriolic acid on powdered nitre, whereby the latter is decompoſed and the acid riſes in the form of fumes. The trials that have been already made have been ſo much in favour of its efficacy, as to have procured it a place in the late inſtructions to Navy Surgeons. As it conſiſts of the fumes of a mineral acid, it is preſumable *a priori*, that it poſſeſſes ſome ſhare at leaſt of the ſame virtue with the volatile vitriolic acid in the ſulphureous fumigation. It is alſo much in its favour, that it takes off the offenſive ſmell of muſty clothes; and ſeveral of the ſurgeons of the navy teſtify, that when the air has been contaminated by the effluvia of fetid ulcers, the nitrous fumigation has a wonderful effect in removing this.

by

by fire; then let them be fumigated with * brimſtone and charcoal, and, finally, white-waſhed all over with quick lime.

Should

* It is remarkable that this method of purifying was practiſed in the moſt ancient times, as we learn from the following paſſage in Homer, where Ulyſſes is repreſented fumigating the apartments of his palace in which the ſuitors had been ſlain:

Τὴν δ' ἀπαμειβόμενος προσέφη Πολυμητις Ὀδυσσευς
Πυρ νῦν μοι πρώτιστον ἐνὶ μεγάροισι γενέσθω.
Ὡς ἔφαθ'. ὐδ' ἀπίθησε φίλη τροφὸς Εὐρύκλεια·
Ἤνεγκεν δ' ἄρα πυρ καὶ θήϊον ἄνταρ Ὀδυσσευς
Ἔυ διεθείωσεν μέγαρον καὶ δῶμα καὶ ἀυλήν.

ΟΜΗΡ. ΟΔΥΣ. Χ.

Bring ſulphur ſtraight, and fire, the Monarch cries;
She heard, and at the word obedient flies.
With fire and ſulphur, cure of noxious fumes,
He purg'd the walls and blood-polluted rooms.

POPE.

This practice was probably founded in ſuperſtition, rather than the knowledge of nature. That ſome divine influence ſhould be aſcribed to fire was very natural, as the principal deities of the ancients were only perſonifications of the elements; and it is worthy of remark, that their name for ſulphur ſignifies *ſomething divine*, το θεῖον, which was probably owing to its being found in thoſe volcanic chaſms of the earth, in Sicily, Italy, and the Lipari iſlands, which were ſuppoſed to communicate with the infernal regions; for the whole Greek mythology relating to theſe was taken from the phænomena attending the ſubterraneous fires in thoſe parts. It is

Should any officer object to the trouble and inconvenience of all this, let him reflect for a moment how much more troublesome and inconvenient, as well as noisome and disagreeable, sickness itself proves to be; let him reflect that the efficiency of the ship, considered as a bulwark of defence, or an engine of annoyance, depends on the number of healthy hands, and that his own character is to depend on the exertions to be

curious farther to remark, in other instances, how facts useful to mankind, the truth of which has been confirmed in later times by the more enlightened knowledge of nature, were first suggested by some superstitious circumstance. Thus the wound received by Telephus could not be cured, according to the Poet, till, by divine intimation, he was desired to apply to it the rust of the spear with which it had been inflicted, in consequence of which it healed. But the weapons in those days were made of brass, so that the rust of the spear must have been the *ærugo æris*, which has been found by the experience of modern surgery to be one of the best detergents in ill-conditioned sores. It is probably, from a false analogy, founded on some such incident, that an idea prevails among the vulgar, which has become proverbial, that some part taken from the offending body is good in all external injuries. Thus some part of a mad dog is said to have a virtue in curing his bite. In this false application may be seen, how far that knowledge which is suggested by superstition falls short of what is acquired by the observation of nature.

made

made by them in the day of battle, not to mention the attention due from him as a man to the ſufferings of the objects themſelves.

But beſides theſe recent infections, it ſometimes happens that the ſeeds of diſeaſe adhere to the timbers of a ſhip for months and years together, and can be eradicated only by a thorough cleanſing and fumigation. Sweeping, waſhing, ſcraping, and airing, are not ſufficient entirely to remove the ſubtile infectious matter; but they will aſſiſt and will prepare it to be acted upon by heat and the fumes of mineral acids, which are the only means to be depended upon.

When a ſhip is at ſea, theſe precautions cannot be taken ſo completely; but if infection is preſent, or is ſuſpected, then cleanſing and the nitrous fumigation may be practiſed.

It will alſo be of great ſervice to make the men expoſe their clothes to the ſun and wind, in order to prevent or carry off muſtineſs or ſlight infection. If a ſtrong infection is ſuſpected, and it cannot be afforded

to deſtroy the clothes, the beſt means of eradicating the poiſon at ſea is to hang them for a length of time over pots of burning brimſtone in a large caſk ſtanding endways, with ſmall apertures to admit air enough for the brimſtone to burn, or the nitrous fumigation may be uſed for this purpoſe.

Fire, where it can be applied ſufficiently ſtrong, is perhaps to be conſidered as the principal agent of * purification, by its heat and the ventilation it occaſions. Next to this may be reckoned the fumes of brimſtone, and thoſe of the nitrous acid. The ſmoke of certain narcotic and reſinous bodies has alſo been recommended, ſuch as tobacco and tar. The vapour of vinegar and the ſmoke of gunpowder have alſo been uſed, but have been known to fail †. It militates alſo againſt theſe, that the attention beſtowed on more trifling means may divert the mind from a proper regard to what is more eſſential. It is mentioned by the benevolent Mr. Howard, that it is the cuſtom in ſome parts abroad to ſcatter freſh branches of pine or ſpruce in

* It is remarkable that the Latin words *purus* and *purgo* are derived from πυρ, fire.

† See Dr. Brockleſby's Medical and Œconomical Obſervations.

the

the hoſpitals, in order to purify the air; but, truſting to this, they neglect the admiſſion of freſh air, which is the only effectual method of ſweetening apartments, and of warding off infection.

There is reaſon to think that the open air very ſoon diſſipates and renders inert all infections of the volatile kind, and of courſe the warmer the air is the more readily it will have this effect. It is accordingly obſerved, that infection is much leſs apt to be generated about the perſons of men, and that it adheres to them for a much leſs ſpace of time in a hot climate than in a cold or temperate one. This is a remark, which, ſo far as I know, has not been made by any author; and, till obſervation ſuggeſted it to me, I fancied the reverſe to be the truth. I have ſeen ſo many inſtances of filth and crowding in ſhips and hoſpitals in the Weſt Indies, without contagion being produced, and which in Europe could hardly have failed to produce it, or to render it more malignant, that I am convinced there is ſomething in tropical climates unfavourable to the production and continuance of infectious fevers.

vers *. The ſhips which bring this fever from Europe, in general get rid of it ſoon after arriving in a warm climate; and nothing but the higheſt degree of neglect can continue or revive it.

The facts above mentioned brought into my mind what is related of the plague at Smyrna and other places, that it diſappears at the hotteſt part of the year. The climate being hotter at Cairo than Aleppo, the plague ceaſes a month ſooner at the former than the latter. It is alſo curious and important to remark, that the true peſtilence never has been heard of between the tropics. It is not eaſy to aſſign the cauſe of this effect of heat upon infection, as every thing relating to this ſubject is very obſcure. We can conceive it to be owing to the greater degree of airineſs which the heat of the climate makes neceſſary, or to the uſe

* A fact related in Anſon's Voyage, is alſo ſtrongly in proof of the ſame opinion. When the rich ſhip from Acapulco was taken, it was neceſſary to crowd the priſoners into the hold, for fear of an inſurrection, which was to be dreaded from their numbers; yet, when they arrived in China, none of them had died, nor had any diſeaſe broke out. They ſuffered only in their looks, being wan and emaciated to a great degree.

of

of fewer woollen clothes. There may be ſomething in the ſtate of the body, particularly in the pores of the ſkin and lungs, which diſpoſes them leſs to produce or abſorb the poiſonous effluvia, or, when abſorbed, it may more readily be thrown out by perſpiration with the other acrimony of the blood; or more probably, as has been hinted above, the virulent matter is of ſuch a degree of volatility as to be readily diſſipated in a certain degree of heat *.

There is a fact, which, though ſeemingly of a contrary tendency, yet is in reality in proof of the ſame opinion. It is, that theſe ſame diſeaſes diſappear in circumſtances of great cold. The plagues which have viſited England have diſappeared in winter; and the ſame is obſerved at Moſcow and other places. In this caſe the infectious matter is rendered *inert*, but not *extinct*, and the return of heat ſets it afloat in the atmoſphere,

* It may be brought as a farther proof of a warm climate being unfavourable to every ſort of infection, that though the itch is very common in ſhips and hoſpitals in Europe, I do not remember ever to have met with it in the Weſt Indies, except in ſhips newly arrived from England.

ſo

ſo as to expoſe it to human reſpiration. *Dr. Guthrie informs us, that infection is entangled and fixed by the cold of winter on the doors and walls of the houſes of the Ruſſian peaſants, and that upon the return of the warm ſeaſon it is ſet looſe by the thaw, and then becoming active, produces diſeaſes.

With regard to the Weſt Indies, the precautions that have been laid down are chiefly neceſſary when a ſhip newly arrives in the climate; for it is during the firſt three or four months that ſickneſs is moſt apt to prevail.

This does not depend upon any thing peculiar to the climate; for I have known ſhips arrive without being viſited with any ſickneſs. It ſeems to be owing, for the moſt part, to that ſtock of infection and diſeaſe imported from Europe exerting its effects, and when this has ſpent itſelf, the men remain in good health, unleſs expoſed to the land air or other accidents; for the air at ſea in thoſe climates, as well as every

* Philoſophical Tranſactions.—Vol. 69.

where

where elſe, is extremely pure and wholeſome, and there is no where that ſeamen are more healthy or comfortable.

SECT. IV.

Of the FOUL and DAMP AIR generated in a Ship.

I MEAN here to diſtinguiſh the unwholeſome vapour produced by the contents of the ſhip from the infection produced by the effluvia of men's perſons, which was treated of in the laſt ſection.

The means of preventing this unwholeſome air from being generated are, cleanlineſs, dryneſs, and ventilation.

All parts of a ſhip may, if neglected, become dirty, and emit an offenſive vapour; but the parts under water, conſiſting of the orlop and hold, are more particularly ſo from the materials they contain, and from the want of free acceſs to the freſh air; accordingly, there is always more or leſs ſtench

ſtench in thoſe parts, even in the beſt-regulated ſhips.

It was mentioned in the * firſt part of this work, that an opinion was entertained by ſome, that no foul air was productive of fevers but ſuch as proceeds from the living human body. I alledged that this was otherwiſe, at leaſt in hot climates; and ſome proofs of this opinion were adduced, particularly from the French prizes. Though the neglect of perſonal cleanlineſs is the principal ſource of diſeaſe, yet cleanlineſs of every kind, and purity of the air in every reſpect, is to be anxiouſly ſtudied.

With regard to general cleanlineſs, it is hardly neceſſary to mention ſweeping, waſhing, and ſcrubbing of the decks; for the natural propenſity of the Engliſh † nation to

* Page 88, and 107.

† This circumſtance, in the character of the Engliſh, is only of modern date; for we learn from Eraſmus, who was in England about two hundred and fifty years ago, that they were then extremely ſlovenly. The following paſſage is extracted from a letter he wrote to a phyſician in York, after his return to Holland:—"Conclavia "ſolâ fere ſtrata ſunt argillâ, tum ſcirpis paluſtribus, qui "ſubinde ſic renovantur ut fundamentum maneat aliquo-

"ties

to neatneſs ſeldom allows any neglect of theſe. Lord Howe, to whoſe virtues as a man, and abilities as an officer, his country is

« ties annos viginti ſub ſe fovens ſputa, vomitus, mic-
« tum canum et hominum, projectam cereviſiam et piſ-
« cium reliquias, aliaſque ſordes non nominandas." He adds, that the windows were very ill calculated for ventilation, and imputes to the cloſeneſs and filthineſs of the houſes, the frequent and long continued plagues with which England was infeſted, and particularly the ſweating ſickneſs, which, he ſays, ſeemed peculiar to this country. He mentions that his own country had been freed from the peſtilence by certain changes that the State had made in the houſes, in conſequence of the advice of ſome learned man. Eraſm. Lib. xxii. Epiſtol. 13.— It is probable that the greater number of thoſe epidemics, called plagues, were only bad infectious fevers. What would contribute ſtill more to the production of infection was the want of linen, which was not in uſe in thoſe days except among a few in the upper ranks of life. The diſappearance, or at leaſt the great diminution of ſuch complaints in modern times, particularly in London, has been aſcribed to the great increaſe in the proportion of vegetable food; but it is certainly more owing to the improvement in perſonal cleanlineſs, and to the greater ſpaciouſneſs and neatneſs of houſes. As a farther proof of this, it may be mentioned that in the charity, called Chriſt's Hoſpital, in London, founded by Henry the Eighth, for the maintenance and education of poor boys, their ſuſtenance is all animal food, as it was at the original inſtitution, yet they are extremely healthy. The ſame obſervation applies to Wincheſter ſchool, which was founded ſome ages before that.

The

is ſo much indebted, gave it in general orders to waſh the upper decks every day in fine

The circumſtances in diet which ſeem to give the common inhabitants of London the advantage over their anceſtors and their cotemporaries in the country, are a more plentiful and nouriſhing food, and the uſe of good malt liquor. I have been ſettled in practice in London for the laſt fifteen years, during which time I had opportunities of knowing the ſtate of health of both ends of the town, having been twelve years phyſician to one of the largeſt hoſpitals in the city; and though I have heard of low fevers prevailing at times in ſome of the alleys where the air is much confined, there has been nothing deſerving the name of an epidemic, beſides thoſe diſeaſes proceeding from ſpecific contagions to which children are chiefly ſubject, and an epidemic catarrh which appeared in the beginning of 1795, whereas we have heard of fevers and fluxes prevailing in different parts of the country, the cauſe of which could generally be traced to low living and bad air in workhouſes or elſewhere.

There are ſome paſſages in ancient hiſtory in confirmation of the advantages of perſonal cleanlineſs. Herodotus relates, that the ancient Egyptians were the moſt healthy of all the nations, except the Libyans, and he imputes this to the invariableneſs of their weather, and the ſerenity of their ſky. But he mentions in another part of his works, that they were alſo the moſt cleanly of all people, not only in their houſehold utenſils, but in their perſons, and that their clothing was chiefly of linen, which it was one of the principal ſtudies of their life to waſh and keep clean —ἑιματα δε λινεα φορεεσι ἀιει νεοπλυτα ἐπιτηδευοντες τυτο μαλιστα. Herodot. Euterp. 37.—It is remarkable that he makes no

fine weather, the lower decks twice a week, and the orlop once a week at leaſt. He alſo ordered that every waſhing, ſmoking, muſtering, and review of clothes, or any other means taken for the health of the ſhip, ſhould be marked in the logbook, and the reaſon to be aſſigned there if omitted at the ſtated times. Theſe rules are a good ſpecimen of the order that ought to prevail in every branch of public duty; for it is well known to every experienced officer, that it is a methodical proceeding of this kind which can alone render ſervice either eaſy or effective.

The loſs of men's lives from the foul air of the well is a common accident in ſhips, and I have been myſelf witneſs to ſeveral inſtances of it. Where there is the leaſt ſuſpicion of this, a candle ſhould previouſly be let down, and if it ſhould be extinguiſhed, it may be concluded that the air is

no mention of the plague, though he gives a very minute account of the country from his own obſervation, from whence it may be naturally inferred, that it did not then exiſt there, though Egypt is now ſo ſubject to it, that it is ſuppoſed by many to be an endemial diſeaſe in that country.

deadly. As this ſpecies of foul air is heavier than common air it requires ſome trouble to remove it.—The moſt expeditious method is to let down fire in a pot or grate, which ſoon changes the air, by producing a draught of it upwards.

It is a very ſalutary practice to let down fires frequently into the well, both in order to purify the air and to dry the ſurrounding parts. It was formerly mentioned that this was daily done in the * Intrepid, and the effect of it was to remove the wetneſs of the ballaſt and the mouldineſs which had overſpread the ſides and beams; and having had the effect of ſweetening and purifying the air, it ſeemed to be the principal circumſtance that tended to make this ſhip extremely healthy from being the moſt ſickly of all the fleet. This precaution, as well as every other point of cleanlineſs, is more neceſſary in large ſhips, becauſe the maſs of foul air, as well as the quantity of corrupting materials, is greater †.

The

* See Page 58.

† It is proper alſo to obſerve here, that thoſe ſhips which are built of winter-felled timber are much drier than thoſe built of what is ſummer-felled; and this circumſtance ſhould have been mentioned with regard to

The following fact ſtrongly evinces the good effect of fire and ſmoke:—When it was the cuſtom for frigates to have their kitchens between decks, they were much more healthy than in the preſent conſtruction, in which they have them under the forecaſtle, where the heat and ſmoke are diſſipated without being diffuſed through the ſhip, and cauſing a draught of air upwards, as formerly. The men derived then alſo great benefit and comfort from having a large fire, round which they might aſſemble to warm and dry themſelves in a ſheltered place. I leave it to thoſe who preſide in the conſtruction of the navy to determine how far it would be adviſeable to return to the old manner of conſtruction. The French ſhips of the line have their kitchens and ovens between decks, and this muſt tend to counteract the effects of their want of cleanlineſs. The Dutch ſhips of the line have their kitchens on the orlop

the Montague; for the cauſe of her healthineſs, notwithſtanding her being a new ſhip, was probably from being built of winter-felled timber. It ſhould therefore be ſtrictly enjoined to fell the wood in winter; for thoſe who are employed to do it have an intereſt in doing it in ſummer, on account of the value of the bark.

deck, which muſt be ſtill more conducive to the general purity of the air.

Moiſture is pernicious both in itſelf and as the inſtrument of putrefaction. All the complaints, called colds, are more owing to wet than cold; and moiſture may be the means of producing, or at leaſt of exciting dangerous fevers, when they would not otherwiſe appear.

It has been made a queſtion by ſome how far ſimple moiſture is pernicious. Although there are many propoſitions that have obtained the general aſſent of mankind, and paſs for matters of fact and experience, without being founded upon principles of real obſervation and induction, yet the moſt enlightened obſervers will, I think, agree with the vulgar in this, that moiſture, whether on the clothes, in apartments, or in the air, is pernicious to health, and tends to produce fevers and feveriſh complaints. Dampneſs or wet ſeems to be more adverſe to health at land than at ſea, in a warm climate than in a cold or temperate one. It is remarked, that the crews of ſhips cruiſing in conſtant fogs on the banks of Newfound-

land often enjoy good health. Nor is mere moiſture at land always injurious to health. Ireland is not only extremely rainy, but the ſoil is very wet from the large bogs with which that kingdom abounds, yet this country has not been conſidered as remarkably unhealthful either to its inhabitants or to ſtrangers. Theſe bogs, however, are compoſed of a matter which is not volatile nor ſubject to putrefaction, ſo that the vapours reſemble thoſe at ſea. It is not ſo with the fenny parts of England, and other countries which are extremely ſubject to intermittent fevers and other complaints. It appears farther, that moiſt air is not only pernicious in itſelf, and from the effluvia exhaling from the earth along with it, but that it is a vehicle of noxious exhalations with which it ſeems to have a greater chemical affinity than with dry air. This cannot be better illuſtrated than by an obſervation common in London, that there are many houſes with which the communications with the common ſewers is not accurately cut off, but the offenſive ſmell is not perceived except when the air is damp. Approaching rain can be predicted by the aſcent of this ſtench. With regard to hot climates, the

difference of a dry and moiſt air cannot be put in a ſtronger point of view than by the two following facts. The firſt is, that there is a periodical wind on the coaſt of Africa called the * Harmattan, which, by its extreme dryneſs in conſequence of blowing over hot ſandy deſarts, abſorbs moiſture with ſo much avidity as to deſtroy vegetation if it continues many days, parches the ſkin, eyes, and lips, and opens the ſeams of wooden furniture. It is however ſo ſalubrious, that fevers and fluxes ſoon recover while it blows, a ſtop is put to epidemics, and the infection even of the ſmall-pox will not take effect. The ſecond fact is, that the Dutch colony of Batavia, while it is the moſt unhealthful of all places, is alſo the moſt moiſt, in conſequence of the great number of canals made there in order to make it reſemble Holland.

We may therefore conſider it as an aſcertained truth of the utmoſt importance, that moiſture, whether adhering to clothes, to the ſides and decks of ſhips, or floating in the air, is pernicious to health, and that one

* Phil. Tranſ. Vol. 71.

of

of the principal means of preſerving health conſiſts in obviating it. The great attention that has of late been paid to dryneſs by officers of the navy ſeems to be one of the principal cauſes of the ſuperior health which at preſent prevails in our ſhips of war. One of the methods lately practiſed for producing dryneſs has been, to rub the decks with ſand heated in the oven.

A wet hold diffuſes moiſt vapour all over the ſhip; and it was a rule with ſome of thoſe commanders whom I obſerved to be moſt ſucceſsful in preſerving the health of their men, not only to have daily fires in the well, but to bail out the water when the pumps could not exhauſt it all, and never to allow it to collect to more than the depth of a few inches. It is, therefore, very doubtful whether it is a good practice to let in water, as is very commonly done in order to ſweeten the hold, for the ſame ſweetneſs will be preſerved if it is kept ſtrictly dry. If it ſhould happen, indeed, that there ſhould be a great deal of putrid matter in the lower parts of the ſhip, from previous neglect or unavoidable leakage, it may be adviſeable to let in a quantity of water

in order to looſen and waſh off what is offenſive, and then to pump it out.

There is a circumſtance in the firſt fitting out of a ſhip well worth attention, as highly conducive to the dryneſs and cleanneſs of the hold. I mean the choice of the ballaſt; for that which is called *ſhingle*, conſiſting all of pebbles, is far preferable to that which is ſandy and earthy, and it does not ſo readily ſoak and retain the moiſture and filth. Water or fluid of any kind readily ſubſides in it, and ſhould any putrid matter be entangled in it, there will be leſs difficulty in waſhing it out.

The decks ſhould not be waſhed ſo often when the weather is moiſt as when it is fine, as it will be more difficult to dry them, and more harm may ariſe from the moiſture than benefit from the cleanneſs; and in climates and ſeaſons where the weather is both wet and cold, it would be moſt adviſeable to omit waſhing altogether, and to depend upon ſcraping and ſweeping. Waſhing ſhould alſo be performed very early in the morning, even in the beſt weather, in order that there may be time for the decks to become

come dry in the courſe of the day. It is after a general waſhing that the moveable fires, formerly deſcribed, are moſt proper and uſeful.

Every contrivance ſhould be fallen upon to change the air in the orlop and hold. Ventilators and windſails * are well adapted for this purpoſe, and ſhould be uſed as frequently and for as long a time as poſſible. It has alſo a good effect in cooling the air in the lower parts of a ſhip in the Weſt Indies, to lift the gratings of the hatches, raiſing them on their edges, and laſhing them to the ſtaunchions. It contributes likewiſe to cleanlineſs and coolneſs to keep the decks as clear as poſſible from † cheſts and other lumber, which are in the way of ſweeping and waſhing, and prevent alſo the free courſe of the air.

* A windſail or windſlieve is a long cylinder of canvaſs, open at both ends, kept extended with hoops, and long enough to reach from the lowermoſt parts of the ſhip through all the hatchways into the open air.

† It is not neceſſary that ſeamen ſhould have cheſts, for bags or wallets anſwer their purpoſe equally well, and are much more convenient in reſpect of ſtowage.

Particular

Particular attention to ventilation is neceſſary in frigates, for almoſt all that part in which the men ſleep is excluded from the air, and they are therefore very uncomfortable in the Weſt Indies unleſs ſmall ſcuttles are cut in the ſides. But if this ſhould be objected to as weakening or endangering the ſhip, there is a good contrivance for the ſame purpoſe, which I met with on board of the Nymphe frigate. It conſiſts of a ſquare wooden pipe, of about nine inches in the ſide coming from between decks, running along the ſide of the ſhip, and opening over the gunwale of the forecaſtle. There was one on each ſide.

A better contrivance than this has lately been adopted on board of ſome hoſpital and priſon ſhips. It conſiſts in an aperture made in the middle of the deck overhead, three feet long by one and a half wide, from whence a tube aſcends tapering into the open air, about ſix feet above the upper deck; and to prevent ſtrong currents of air from deſcending, a ſcreen is made to traverſe with the wind by means of a vane, ſo as to keep the opening to leeward of it.

SECT.

SECT. V.

Means of guarding againſt INFECTION and BAD AIR.

INFECTION never prevails to ſuch a degree, as to affect every perſon indiſcriminately who is expoſed to it. Even where the plague and ſmall-pox prevail to the greateſt degree, there are ſome perſons who, though ſuſceptible of theſe diſeaſes, yet eſcape them. There are certain other infections of a weaker nature, as was before obſerved, and theſe will remain entirely inactive, till they find a proper concurrence of external circumſtances and conſtitutions ſo diſpoſed as to be fit ſubjects of their action. The ſeeds of diſeaſe may be compared to thoſe of vegetables, which lie dormant, unleſs they happen to fall into a ſituation peculiarly adapted for exciting their activity, and for which a number of requiſites muſt concur, ſuch as a given degree of temperature, moiſture, ſoil, ſhelter, and reſt, adapted to each particular ſpecies. It is very difficult to account for this uncertainty in the operation of infection, but it is extremely providential,

vidential, that under the moſt calamitous ſtate of ſickneſs, there are always ſome who are in health and who ſurvive, for the neceſſary purpoſes of life. If this were not the caſe, it might happen that every perſon on board of a ſhip might periſh from ſickneſs in the courſe of a voyage, a circumſtance which I believe has never been known to happen.

There is an endleſs variety in the conſtitution of the human frame, both in mind and body, as well as in the features of the face. There are, perhaps, no two individuals in the world in whom the ſame effect preciſely is produced by the ſame food, air, medicine, poiſon, or paſſions of the mind. The different effects of infection, therefore, upon different people, ſeem to depend, in many caſes, on peculiarities of conſtitution as well as external circumſtances too obſcure to be explained; but there are alſo known circumſtances which reſiſt or encourage its effects.

The great power of habit* in taking off the

* Since the firſt edition of this work was publiſhed, I have met with a fact in confirmation of this principle, with

the effect of infection, has already been mentioned, and it would appear that novelty gives an increaſed energy and activity to all impreſſions, as well as thoſe on the ſenſes. If a perſon, therefore, eſcapes the firſt attack of infection, he will be more likely to continue expoſed to it with ſafety in future.

There are certain precautions neceſſary to be attended to by thoſe who are unavoidably expoſed to contagion, particularly in the firſt inſtance. Thoſe who can afford a full diet, and a liberal uſe of wine, have been obſerved to reſiſt infection better than thoſe who uſe food and drink that is meagre and watery. It is alſo a good rule not to go among the ſick, nor otherwiſe to expoſe one's ſelf to infectious air, with an empty ſtomach; for whether it is that the body is then more ſuſceptible, or that the pores of the ſkin and lungs are in a more highly abſorbing ſtate, ſo as with greater readineſs to inhale the poiſon of diſeaſe, it is certain that

with regard to the cutaneous complaint called the *ring-worm*. This had prevailed in a private ſchool in the neighbourhood of London, which I viſited, but it had to all appearance become extinct; yet it nevertheleſs affected thoſe boys who were newly ſent to the ſchool.

a perſon

a perſon in that ſituation is more apt to catch harm from foul air of any kind.

The moſt uſual method of catching fatal infections is by the breath, and the greater number of contagious diſeaſes affect either the lungs themſelves or ſome of the avenues of reſpiration, in the form of peripneumonic complaints, catarrhs, and ſore throats. This is obſervable with regard to the ſmall-pox, meaſles, hooping cough, epidemic catarrhs, the ſcarlet fever, the * plague of Athens, to which may be added the thruſh † and the mumps. The ſame remark holds with regard to the epidemics of animals, ſuch as the glanders in horſes, and the contagious diſtemper among dogs. The principal cauſe of ſafety from ‡ inoculation ſeems to

* Thucydides, B. II.

† It appears by the journal of ſome of the ſurgeons of ſhips of war, that the mumps and the thruſh will ſometimes prevail among a crew like an epidemic, but not ſo as to prove fatal.

‡ Another probable reaſon for the ſafety of inoculation may be, that when the poiſon is imbibed ſpontaneouſly from the air, it is only in thoſe moments when the ſyſtem is moſt prediſpoſed for its reception, whereas inoculation obtrudes it, as it were, at thoſe times in which

to conſiſt in avoiding this mode of introducing the poiſon, whereby the vital parts are leſs affected. As reſpiration is a function which does not admit of interruption, the inhaling of vitiated air muſt be extremely difficult to avoid, but the common practices of breathing through a handkerchief or with plugs in the noſe, with a view to filter or purify the air, ſeems to be founded in reaſon.

Whatever weakens and exhauſts the body, renders it alſo more ſuſceptible of noxious impreſſions. Under the head of weakening powers, I comprehend not only what empties the body of its fluids, ſuch as loſs of blood, or a diarrhœa, but intoxication, fatigue, faſting, watching, and certain affections of the mind, ſuch as care, grief, and fear, which produce a languid circulation and weaken the powers of life. Prediſpoſitions are thus eſtabliſhed by previous habits in conſequence of a long ſeries of impreſſions from heat, cold, food, exerciſe, and paſſions,

which the conſtitution is leaſt diſpoſed to yield to its impreſſion. (See this principle farther illuſtrated in a Lecture on Muſcular Motion, read before the Royal Society, Nov. 1788, by G. BLANE, M. D.)

which

which are again modified by the diverſity of original ſtamina, producing an endleſs variety of conſtitutions ſuſceptible of diſeaſe in different degrees and forms. It is owing to this modification from previous impreſſions, that the diſeaſes prevailing at any particular time are not imputable merely to the actual ſtate of the weather but to what has preceded. Thus the inflammatory diſeaſes of March are owing to the previous cold of winter, and the choleras of Auguſt to the heats of July. As a farther illuſtration of prediſpoſition being formed by external habits, it may be remarked that particular * claſſes of ſociety, and particular † nations are

* It ſometimes happens that the rich are ſubject to epidemics from which the poor are exempt, but the reverſe is more frequently the caſe. In the laſt plague of London, the people of condition who fled from town found upon their return that very few of their friends and acquaintances had died, the mortality being almoſt entirely confined to women and children, and the pooreſt and loweſt ſort of people. (See Continuation of the Life of Lord Clarendon by himſelf.) Theſe facts are additional proofs of the principle ſo much inſiſted on in this work, of the neceſſity of a concurrence of circumſtances in order to give effect to infection.

† A very fatal epidemic prevailed among the Indians in 1763, in Nantucket and Rhode Iſland, which affected none of the Engliſh inhabitants, though intermixed with them. There are ſeveral facts of the ſame kind recorded both by ancient and modern phyſicians.

exempt

exempt from the influence of infection. Beſides theſe cauſes prediſpoſing to the action of infection, there are others which immediately excite it. The chief of theſe is cold. This is of itſelf ſimply productive of catarrhs, rheumatiſms, and the like diſorders; but if an infection ſhould be accidentally preſent when the body is expoſed to it, then inſtead of theſe complaints, the diſeaſe peculiar to that infection will be produced *. This was illuſtrated in the laſt reinforcement we had from England; for while bad fevers were breaking out in moſt of the other ſhips, the † Union was affected with thoſe complaints only which are ſimply the effects of cold. It would be more proper, perhaps, to ſay, *expoſure to the air*, than to call it *cold*; for expoſing the naked body to the open air, even in the warmeſt climate, is prejudicial to health. This holds at leaſt with regard to Europeans who are accuſtomed to clothing, however the natives of hot climates

* It is mentioned by Thucydides, that while the plague raged at Athens, the people were affected with no other diſeaſe; from which it would appear that thoſe perſons who would otherwiſe have been attacked with ſome particular indiſpoſition, were ſeized with the plague in place of it. Vide note, p. 247.

† Part I. Book II. Chap. VI.

who are accuſtomed to go naked, may expoſe themſelves with impunity.

It is of the greateſt conſequence to aſcertain the extent of the influence of infection, for the means of avoiding and preventing it will very much depend upon this. It is now known, that infection extends itſelf to a very ſmall diſtance. There are, indeed, ſome morbid poiſons, ſuch as that of the bite of a mad dog, and that of the venereal diſeaſe, which require actual contact to make them take effect. Others are more volatile, and ſeem to be inhaled by the breath, or abſorbed by the ſkin, but theſe do not extend far; that of the plague * does not reach above a few yards, and that of the ſmall-pox and of fevers is probably equally limited. This diſcovery is very va-

* It is related by the travellers into Turkey, that the Chriſtians ſave themſelves from it, merely by ſhutting themſelves up in their houſes, and the inhabitants, who ſleep on the open roofs of the houſes, do not catch it even from thoſe of the adjacent buildings, though the wall that ſeparates them is of no great height; and though they are ſupplied with proviſions by the windows, handed to them by the infected, who ſometimes drop down in the act, yet they do not catch it, though the ſmalleſt rag from the infected would communicate it.

luable

luable, by aſcertaining the limits of danger; for when a perſon imagines he runs the ſame riſk when at a conſiderable diſtance from the ſeat of diſeaſe, as if he were in contact with the perſon affected, he will be apt to expoſe himſelf wantonly and unneceſſarily to the infection.

It ſeems to be owing to the ignorance of the extent of its influence, that the plague has in general been ſo fatal; for in conſequence of the opinion that the whole ſurrounding atmoſphere was affected, it was vainly attempted to purify it by large fires in the open air, or by * firing off artillery, inſtead of truſting to the ſeparation of the ſick ſo as to avoid their near approach, and to the confinement of thoſe in health to their own houſes, which are all the precautions neceſſary to prevent its progreſs, and which were neglected on the ſuppoſition that the contagious matter was widely diffuſed through the atmoſphere.

* Vide Opera Ambroſii Parei.

CHAP. II.

Of ALIMENT.

SECT. I. Of SOLID FOOD.

THE moſt unnatural circumſtance in a ſea life is the food which men uſe, and the diſeaſe moſt peculiar to it is one which is owing chiefly to the nature of the aliment; for though other cauſes conſpire in aggravating the ſcurvy, the depraved ſtate of the INGESTA is the uſual and principal cauſe of it.

It is this diſeaſe that is moſt fatal to ſeamen next to fevers. It was formerly as fatal, if not more ſo; but ſome modern improvements have rendered it leſs frequent and violent. The habitual uſe of ſalt proviſions, beſides producing evident ſymptoms of ſcurvy, begets ſuch a ſtate of the conſtitution, that, upon the leaſt ſcratch being received, particularly on the lower extremities, a large and incurable ulcer enſues; and this circumſtance, trifling as it appears, is the

the cauſe of loſing an incredible number of men to the ſervice, eſpecially in the Weſt Indies. The greater part of the food of a ſhip's company is neceſſarily ſalted meat. Biſcuit and peaſe, though of a vegetable nature, are hard of digeſtion; and though they qualify the animal food, they do not anſwer the purpoſe of freſh vegetables. Though officers have a ſupply of live ſtock even for the longeſt voyages, it would be impracticable to carry a quantity ſufficient to preſerve a whole crew from the ſcurvy. But certain articles have of late been introduced into uſe, of a durable and portable nature, which ſo qualify the ſalt proviſions, that they can be uſed without inducing this diſeaſe. Theſe conſiſt either of articles of common diet, ſuch as melaſſes and ſour krout, or thoſe which are intended only for the ſick and recovering, ſuch as portable ſoup and the preſerved juice of lemons and limes.

It is one of the moſt ancient and real grievances in the ſervice, that there has not been a ſufficiently ample ſupply of nouriſhment and cordials for the weak and recover-

ing. This complaint is made by * Dr. Cockburn, who was phyſician to the fleet in the end of the laſt century; and it is a complaint that has not yet been entirely redreſſed, nor has the ſubject been conſidered with the attention it deſerves. The only improvement in the ſea victualling that I know of from that time till of late, has been the uſe of raiſins for puddings, and the occaſional uſe of vinegar, which is an article extremely ſalutary, and was looked upon as the great preſervative of health in the Roman armies.

After the force of diſeaſe has been ſubdued at ſea, men are frequently loſt by relapſes, or pine away in dropſies and other chronic complaints, for want of being ſupported by ſome cordial and nouriſhing diet. It is mentioned in my memorial to the Admiralty, how inſufficient the ſmall quantity of ſurgeon's neceſſaries are; and it is recommended that a large quantity of certain ſpecies of refreſhment ſhould be put in the purſer's charge, which, being ſubſtituted for the common ſea victualling while men are ill or recovering, would coſt Government

* See Eſſay on Sea Diſeaſes.

little

little or nothiug. Beſides the articles already mentioned, it was recommended to ſet apart a quantity of the beſt wines, and to be provided with brown ſugar, dried fruits, barley, rice, ſago, and ſalep. Carrots and other roots might alſo be preſerved for the longeſt voyages by means of ſugar; and green vegetables might in like manner be preſerved by means of ſalt. But of all the articles, either of medicine or diet, for the cure of the ſcurvy, lemons and oranges * are of much the greateſt efficacy. They are real ſpecifics in that diſeaſe, if any thing deſerves that name. Upon what principle their ſuperior efficacy depends, and in what manner they produce their effect, I am at a loſs to determine, never having been able to ſatisfy my mind with any theory concerning the nature and cure of this diſeaſe, nor hardly indeed of any other. The great utility of theſe vegetable juices cannot be ſufficiently impreſſed on the minds of thoſe who direct the Navy.

* Limes, ſhaddocks, oranges, and perhaps all the other fruits of the natural order called heſperidæi poſſeſs the ſame virtues. Whenever I mention lemons or lemon-juice, it is to be conſidered as a ſhort expreſſion for the whole of this order.

Every perſon who has beheld with attention and feeling the tedious and languiſhing ſeries of ſuffering which the ſick and recovering endure for want of the means of ſupporting and recruiting their ſtrength and ſpirits, muſt wiſh that thoſe who preſide in the civil department of the navy would ſeriouſly conſider this ſubject, and complete the reform that has already been begun *.

With

* With a view to promote this the following article was propoſed in the new inſtructions drawn up for the guidance of Navy Surgeons in the year 1796. "When men are admitted into your liſt, inſtead of their allowance of ſalt beef, pork, biſcuit, ſmall beer, or rum, you are to demand of the purſer through the captain, in lieu of the above articles, ſuch quantity of the following as you may judge proper for the ſituation of your patients, viz. barley, rice, oatmeal, melaſſes, raiſins, flour for ſoft bread, portable ſoup and wine. Theſe, with the articles under your own charge, will prove a comfortable diet for the ſick and convaleſcent." This was adopted with the other articles by the Admiralty, but was ſuſpended for reaſons which it is needleſs here to detail. This, or ſome other mode of victualling the ſick is greatly wanted, for were it not for the general humanity of officers in ſupplying refreſhments to the ſick from their own table, they would labour under the utmoſt diſtreſs. This practice is highly honourable

With regard to the victualling of men in health, a moſt commendable attention has been paid to the improvement of it. The ordinary articles of victualling have not only been of excellent quality, but ſome new articles have been added, from which the greateſt benefit has been derived. The chief of theſe are ſour krout and melaſſes. The latter was firſt brought into uſe by Captain Ferguſon in the beginning of the late war. He ordered it to be ſerved with rice to the men who were affected, or threatened with the ſcurvy, in the ſhip under his command. The benefit experienced from it in this and other inſtances was ſo great, that during the laſt two years of the war it was made a regular article of ſea victualling,

honourable to the character of our ſea officers; but any thing dependent on the caſual bounty of individuals is too precarious a proviſion in ſuch an important point of ſervice.

The preſent aſſortment of neceſſaries allowed for a hundred men for three months is as follows: ſix yards of linen, four yards of Welſh flannel, three pounds and a half of tea, two pounds of chocolate, four pounds of ſago, eight pounds of rice, ſixteen pounds of barley, twenty-four pounds and a half of ſoft ſugar, two ounces of ginger, two ſaucepans.

and

and ſubſtituted in place of a certain proportion of oatmeal *.

As

* In the courſe of the paſſage from England to the Weſt Indies in February, 1782, the following directions for uſing the ſour krout and melaſſes were given in public orders by the Admiral to the different ſhips of the ſquadron:

" The allowance of ſour krout made by the public " boards in England, is two pounds to each man every " week; and the Admiral orders that from a pound and " a half to two pounds (beginning with the leſſer quan- " tity, and increaſing as the men may find it palatable) " be boiled with every gallon of peaſe on a peaſe day. " The cooks are deſired not to waſh it, nor to put it " into the coppers till the peaſe are ſufficiently broken. " Half a pound is directed to be iſſued raw to each man " on beef days, and a quarter of a pound on pork days. " It is recommended that the allowance of vinegar be " ſaved particularly on meat days. When ſour krout " runs ſhort, the peaſe and beef days to have the prefer- " ence; when ſhorter ſtill, the peaſe days. Melaſſes " having been allowed in lieu of part of the oatmeal, in " the proportion of eleven pounds to two gallons, the " Admiral directs, that a pound of melaſſes be boiled " with every gallon of oatmeal on Mondays, Wedneſ- " days, and Fridays, mixing it and ſtirring it round " with the burgoo immediately after it is drawn off. " He directs that half a pound of melaſſes be iſſued " with every three pounds of flour, over and above the " common proportion of raiſins; and to prevent any " abuſe, it is directed that the purſer's ſteward pour it " into the platter with the flour of which the pudding is " made.

As bread is one of the principal articles of diet, the utmoſt care ſhould be taken in preſerving it, and great advantage would ariſe from ſtowing it in caſks that are water tight, inſtead of keeping it in bags, or letting it lie looſe in the bread room. Captain Cook, by this method, and by giving it a caſt in the oven in the courſe of the voyage, preſerved his biſcuit ſound in every reſpect for more than three years. But the greateſt improvement in this article of diet would be to have, in the form of flour, a greater proportion of what is now allowed in bread. The flour might be made into puddings, and ſeems, in this form, to be more nutritious and antiſcorbutic than biſcuit which has undergone a ſtrong force of fire. This ſort of meſs would be ſtill more proper and agreeable now that melaſſes is a ſtated article of diet. Flour, by being well preſſed and rammed, will keep as long as biſcuit,

" made. The Admiral forbids the uſe of peaſe in lieu of " oatmeal, as has ſometimes been the practice."

Theſe rules were ſuggeſted by Sir Charles Douglas, captain of the fleet, whoſe benevolence is equal to his known profeſſional ſkill; and he had aſcertained the utility of the preceding directions when captain of the Duke in the former part of the war.

and

and it can be ſtowed in one fifth part of the ſpace; it will, therefore, coſt much leſs in freight than the ſame quantity of it in that form, and it may be baked abroad if neceſſary *.

Of all the former articles of ſea victualling, there was none more abuſed than oatmeal. The quantity allowed to each man was twice as much as he could conſume, and the overplus went to the purſer's profits, or was waſted by being given to the hogs, or even wantonly thrown overboard. Melaſſes have, with great advantage, been ſubſtituted for part of it, in the proportion of

* In the French ſhips of war there is an oven large enough to ſupply not only all the officers and ſick, but part of the crew, with ſoft bread every day. The advantages attending the uſe of flour in place of bread are ſo great and obvious, that the former will probably, in time, be ſubſtituted entirely for the latter. We have already ſeen (p. 138) the practicability and good effects of baking under all the inconveniencies of the old fire-places. The objection chiefly made to it at that time was the greater conſumption of wood occaſioned by baking; but this is now obviated by the general adoption of the fire-places of caſt iron, invented by Mr. Brodie, in which the ovens are heated by the ſame fire with which the victuals are boiled.

eleven

eleven pounds for two gallons of oatmeal. The firſt trial of melaſſes was in the * Foudroyant, and it anſwered ſo well, that, in a cruiſe under Admiral Geary in 1780, this was the only ſhip free from the ſcurvy, and out of two thouſand four hundred men that were landed at the hoſpital with this diſeaſe, there were none from this ſhip. It appears to be ſo ſimilar in its nature and effects to eſſence of malt, that it ſeems hardly worth while for Government to be at the expence of providing the latter †.

A certain proportion of barley has alſo of late been ſubſtituted for part of the oatmeal, which being more light and palatable, makes a pleaſing variety, particularly to the ſick and recovering. Captain Cook carried wheat with him, and found it to anſwer equally

* Mr. Nepean, afterwards Under Secretary of State, and now (1798) Secretary to the Admiralty, was at that time purſer of the Foudroyant, and acted a very benevolent and diſintereſted part, by being inſtrumental in introducing this reform in the navy victualling.

† It is now (1798) diſcontinued by orders from the Admiralty, lemon-juice having been found adequate to the prevention and cure of ſcurvy, and the expence attending it is little more than what the eſſence of malt coſt to the public.

well.

well. It would not be right, however, to abolish oatmeal entirely; for it is a good article of diet, and serves for gruel and poultices. There is also a certain preparation of it which is an antiscorbutic of equal, and perhaps superior, efficacy to any whatever, except the juice of lemons and oranges. This is flummery, or sowins, which is prepared by letting oatmeal and water stand together till they grow acidulous, and then boiling them into a jelly. I know of some well-attested instances of the crews of ships being saved from the scurvy by this alone.

Butter is a good article of victualling, in so far as it renders that part of the diet which consists of grain and vegetables more palatable, and thereby induces men to eat more. But as it is extremely corruptible in a warm climate, hardly any being used by the seamen but what is more or less rancid, it should never be sent to a tropical station. Greater quantities of it are condemned than of any other article of victualling, and it is therefore the most expensive to Government. There are certain articles that are the natural produce of the West-India islands, which may be substituted for it with the greatest advantage. These are sugar and

cocoa *, which, during the laſt year of the war, were ſerved in place of butter with great ſucceſs, and this proved an alteration in diet not only ſalutary, but agreeable to the ſeamen, whoſe inclinations are always to be conſulted in ſuch changes †.

This

* Half a pound of cocoa, and as much ſugar, was allowed in place of a pound of butter.

† TABLE, exhibiting the daily Allowance of Proviſions for each Man in the Navy.

	Biſcuit.	Beer.	Beef.	Pork.	Peaſe.	Oatmeal.	Butter.	Cheeſe.
	lbs.	galls	lbs.	lbs.	Pint.	Pint.	ozs.	ozs.
Sunday - -	1	1		1	half			
Monday - -	1	1				1	2	4
Tueſday - -	1	1	2					
Wedneſday -	1	1			half	1	2	4
Thurſday -	1	1		1	half			
Friday - -	1	1			half	1	2	4
Saturday - -	1	1	2					

This has continued from the laſt century till the alterations above mentioned, all of which, except the introduction of vinegar, currants, and raiſins, have been made in the three laſt years of the war which ended in 1783. When the ſtock of ſmall beer is exhauſted, half a pint of ſpirits is allowed daily, diluted with four or five times

When a ſhip is in port, encouragement ſhould be given to the ſale of roots, greens, fruits, and ſugar. The men have a good cuſtom of exchanging part of their bread, beef, and pork, for what they can get from the ſhore; but as they in general prefer ſpirituous liquors to the above-mentioned articles, the greateſt care and vigilance ſhould be uſed to preclude men from ſuch opportunities of injuring themſelves. Every ſhip ſhould be furniſhed with a ſeine, and other implements for fiſhing, when in harbour.

When captures are made, in which there are ſuch articles as ſugar, wine, rice, or fruits, it would be much better in many caſes to allow the immediate uſe of them at ſea, where the men may be diſpoſed to ſcurvy or other diſeaſes, than to wait for the converſion of them into money.

Though it has been my object to introduce as many articles of diet as poſſible, in-

times its quantity of water. When wine is ſupplied, the daily allowance of it to a man is one pint. Other exchanges are uſual on foreign voyages, ſuch as three pounds of flour and half a pound of raiſins, or half a pound of currants, or half a pound of beef ſuet pickled, in lieu of a four pound piece of beef, or a two pound piece of pork, with peaſe. Half a pound of rice is allowed for a pint of oatmeal.

dependent

dependent of ſalt proviſions, it does not follow that theſe are in themſelves unwholeſome. They are pernicious by being made almoſt the ſole and excluſive article; but if uſed in moderate quantity, they are even in ſome reſpects well adapted for the food of ſeamen. The nature of their life gives them a ſtrong digeſtion: in their duties they not only employ violent exerciſe, but uſe more muſcles and a greater variety of poſtures and motions than men of any other profeſſion. To ſuch conſtitutions may not food of a refractory nature and hard of digeſtion, have even an advantage over what is more delicate and digeſtible?

It does not appear that it is the ſalt quality alone of the proviſions uſed at ſea that makes them productive of ſcurvy, but alſo the want of their native juices and of the nutritious principle. A ſmall quantity of ſalt is neceſſary to make all food palatable and wholeſome, in ſo much that it is reckoned one of the neceſſaries of life. All animals have a craving for ſea ſalt, and nature has kindly made it the moſt abundant and univerſal of all ſaline bodies. Food, without this ſeaſoning, not only comes to be

loathed, but the want of it renders the animal weak and flabby. As it not only aſſiſts digeſtion, but invigorates all the bodily functions by ſtimulating and bracing the fibres, it is in ſome caſes a valuable medicine. It is remarkable that men are very apt to tire of a long continuance of freſh proviſions *, but never of what is ſalt; and even under the ſcurvy the latter will be reliſhed, and ſometimes preferred to moſt other kinds of food. It has been a practice with ſome to make the ſcorbutic men drink ſea water; but though it is not attended with any manifeſt benefit, I never heard that it aggravated the diſeaſe.

I was told by the gentlemen of the army at New York in 1780, that the ſoldiers in cantonments were not near ſo ſubject to agues as the people of the country; and the only difference in their mode of life was, that the former had in their allowance a certain proportion of ſalt proviſions.

* The ſailors in the ſquadron of Commodore Anſon never murmured more under any of their hardſhips than when they were fed with freſh turtle for a length of time in the South Sea.

In

In an unhealthy country I ſhould think the uſe of ſalt, as well as ſpice *, would be

* Since the firſt edition of this work was printed, I have met with a book publiſhed by Mr. Fletcher, a navy ſurgeon, in which he mentions that ſpices, being antiſeptic bodies, might be ſubſtituted for part of the ſalt in curing proviſion, and this would, no doubt, be an improvement in the ſea victualling. The quantity of ſpice he propoſes for every barrel of beef or pork is four ounces of black pepper, and as much allſpice, and alſo eight ounces of nitre in powder. It may be farther alledged as an advantage of ſpice over ſalt, that it would be leſs apt to run into brine, which robs the meat of the greater part of its nouriſhment.

Since the laſt edition of this work was publiſhed, I have made ſome trials of curing beef by half the uſual quantity of ſalt, and in place of the other half I cauſed to be added to every hundred pounds one pound of pounded pimento, and as much powdered juniper berries, and an ounce and a half (liquid meaſure) of muriatic acid. The powdered ſpices were mixed with the ſalt and rubbed on the beef, and the acid mixed with the pickle uſed in the common method of curing beef. I ſent part of it to the Weſt Indies, and ſeventeen months after it was cured, and about fourteen months after being in that climate, it was opened by direction of rear-admiral Ford, who obligingly undertook to ſuperintend the experiment, and the report made was that it was perfectly ſweet and juicy, and ſo freſh that ſalt would have been neceſſary to give it a reliſh had it not been for the ſpices. I kept by me in London ſome that was cured at the ſame time and in the ſame manner, examining it at different times, and found that it was perfectly good at the end of five years.

ſalutary; and when ſhips are in port it would perhaps be better to allow a certain proportion of ſalt proviſions, becauſe it would not only be wholeſome and agreeable, but the men's conſtitutions would probably be more reconciled to an entire ſalt diet when neceſſary: but I would except from this the crews of ſuch ſhips as have newly arrived from a long cruiſe or voyage, in which it may be neceſſary to alter the conſtitution as quickly as poſſible by a diet entirely freſh.

Nothing that I have collected from my own obſervation, or that of others, has been neglected under this head, except one particular caution with regard to the preparation of the victuals. The large utenſils employed to boil the proviſions are made of copper, and it ſometimes happens from neglect that theſe are allowed to contract a ruſt, which is one of the moſt active poiſons we know. The neglect conſiſts chiefly in allowing any thing acid, or what is liable to become acid, ſuch as gruel or burgoo, to remain for a length of time without being waſhed out; for when victuals have been prepared in the boilers thus uncleaned, they produce

produce the moſt violent effects, even to the loſs of life, as once happened in a ſhip belonging to our fleet *.

* This accident happened in the Cyclops frigate in September, 1780. Mr. Gordon, the ſurgeon, favoured me with the following account of it:

"Mr. Smith, an officer, John Barber and Anthony "Wright, ſeamen, having eat ſome victuals prepared in "a foul copper, complained ſoon after of violent gripes, "giddineſs, and vomiting, and they had a few looſe "ſtools. There was intenſe heat; the pulſe was quick, "full, and hard; a tremor of the hands and tongue, "and wildneſs of the eyes. The looſeneſs was ſoon "ſucceeded by obſtinate coſtiveneſs, tenſion of the ab-"domen, difficult breathing, and loſs of deglutition. "In the night, towards the morning, there came on "inſenſibility, with an increaſe of all the ſymptoms "except the heat. The body was violently convulſed, "with cold clammy ſweats and coldneſs of the ex-"tremities. The abdomen ſubſided a ſhort time before "they died, and, before they expired, a ſmall quantity "of greeniſh matter, mixed with phlegm, iſſued from "the mouths of two of them.

"Thirty-three other men were put on the ſick liſt "with ſimilar ſymptoms in a leſs degree, and ſome of "them continued on the liſt for five or ſix weeks before "they perfectly recovered."

It is not ſaid what means were attempted for the recovery of theſe men; but, beſides emetics and milk, or oil, a dilute ſolution of the fixed alkali in water has been recommended againſt this poiſon, as it would, on the principles of chemical affinity, decompoſe the verdigreaſe, which is a metallic ſalt.

SECT. II. Of Drink.

As the ſolid part of ſea diet is very dry and hard, and as the ſalt it contains is apt to excite thirſt, a freer uſe of liquids than at land is neceſſary, particularly in a hot climate.

It has been the cuſtom, as far back as we know, to allow ſeamen the uſe of ſome ſort of fermented liquor. We need hardly inquire if this is ſalutary or not; for it would be impoſſible at any rate to withhold it, ſince it is an article of luxury, and a gratification which the men would claim as their right. There is a great propenſity in ſeamen to intoxicating liquors, which is probably owing to the hardſhips they undergo, and to the viciſſitudes and irregularities of a ſea life. But there is reaſon to think that all ſorts of fermented liquors, except undiluted ſpirits, are conducive to health at ſea, when taken in moderation.

There is no doubt that malt liquor is extremely wholeſome and antiſcorbutic. The common

common quantity of ſmall beer allowed daily is ſo liberal, that few men make uſe of their whole allowance; and there is no objection to the conſtant uſe of it, except that it is apt to ſpoil in the courſe of a few weeks, and that upon foreign ſtations the ſtock can ſeldom be renewed. One of the greateſt improvements that could be made in the victualling of the navy would be the introduction of porter *, which can be preſerved in any climate for any length of time that may be neceſſary.

Spruce beer ſeems to poſſeſs ſimilar and

* I was furniſhed by Dr. Clephane, phyſician to the fleet at New York, with the following facts, as a ſtrong proof of the excellence of this liquor:

In the beginning of the war two ſtore ſhips, called the Tortoiſe and Grampus, ſailed for America under the convoy of the Dædalus frigate. The Grampus happened to be ſupplied with a ſufficient quantity of porter to ſerve the whole paſſage, which proved very long. The other two ſhips were furniſhed with the common allowance of ſpirits. The weather being unfavourable, the paſſage drew out to fourteen weeks, and, upon their arrival at New York, the Dædalus ſent to the hoſpital a hundred and twelve men; the Tortoiſe ſixty-two; the greater part of whom were in the laſt ſtage of the ſcurvy. The Grampus ſent only thirteen, none of whom had the ſcurvy.

equal virtues with malt liquor; and it has this advantage, that the materials of it can at all times be carried about and uſed occaſionally. It agrees with malt liquor in being a fermented vegetable ſweet, the principal ingredient of it being melaſſes. The other ingredient, from which it takes its name, being a balſamic ſubſtance and therefore diuretic, ſeems to be more medicinal and antiſcorbutic than hops, and is therefore, perhaps, preferable to malt liquor. There have been ſufficient proofs of its virtues in ſingle ſhips; and all the men of war that go to America and the Weſt Indies might be conveniently ſupplied with it. Admiral Pigot provided a ſufficient quantity for the whole fleet; but the peace coming on prevented the trial of it.

The moſt ſalutary kind of drink next to malt liquor, and ſpruce beer, is wine. The benefit which the fleet derived from it at different times, and the advantage it has over ſpirits has been often taken notice of in the former part of this work. It ſeems to be owing to this that the French fleet ſometimes enjoys ſuperior health to ours, and

and is leſs ſubject to the ſcurvy *. Wine is alſo preferable to every other medicine in that low fever with which ſhips are ſo much infeſted; and there is no cordial equal to good wine in recruiting men who are recovering.

Spirits differ from wine in this reſpect, that they are a mere chemical liquor, incapable of aſſimilation with our fluids, having loſt in diſtillation the native vegetable principle in which the whole of its nutritious quality and great part of its medical virtue reſides.

The abuſe of ſpirituous liquors is extremely pernicious every where, both as an interruption to duty, and as it is injurious to health. It is particularly ſo in the Weſt Indies, both becauſe the rum is of a bad and unwholeſome quality, and becauſe this ſpecies of debauchery is more hurtful in a hot

* We have a remarkable proof of this in comparing the fleet under the command of Admiral Byron with that under the Count d'Eſtaing, when they both arrived from Europe on the coaſt of America in the year 1778, ſome of the Britiſh ſhips having been unſerviceable from the uncommon prevalence of ſcurvy, while the French were not affected with it.

than

than in a cold climate, and one of the moſt common cauſes of exciting the malignant fevers peculiar to tropical countries.

It is with reaſon that the new rum is accuſed of being more unwholeſome than what is old; for, when long kept, it not only becomes weaker and more mellow by part of the ſpirit exhaling, but time is allowed for the evaporation of a certain nauſeous empyreumatic principle which comes over in the diſtillation, and which is very offenſive to the ſtomach. Therefore, though this is the produce of the Weſt-India iſlands, yet what is ſupplied there is inferior to that which is brought from England. Another objection to the rum ſupplied in the Weſt Indies is the admixture of lead, which it acquires from the veſſels employed in diſtilling *.

It was originally the cuſtom to ſerve ſeamen with their allowance of ſpirits undiluted. The method now in uſe, of adding water to it, was firſt introduced by Admiral

* See a paper on this ſubject in the 3d Vol. of the Medical Tranſactions, by J. HUNTER, M. D.

Vernon in the year 1740, and got the name of *grog*. This was a great improvement; for the quantity of half a pint, which is the daily legal allowance to each man, will intoxicate moſt people to a conſiderable degree, if taken at once in a pure ſtate.

The ſuperiority of wine over ſpirits in any ſhape was ſo conſpicuous, that towards the end of the war the fleets in the Weſt Indies and North America were ſupplied with nothing but wine, and with a ſucceſs ſufficient to encourage the continuance of the ſame practice in future.

Of Water.

As water is a neceſſary of life, and as the health and comfort of men at ſea depend upon its quality, it deſerves particular attention.

Spring water is to be preferred to running or ſtagnated water; for, unleſs it is taken at the ſource, or near it, it is apt to be impregnated with decayed vegetable and animal ſubſtances, ſuch as leaves, graſs, wood, and dead inſects. This inconvenience is greateſt in a hot climate, where every thing teems

teems with life, and where the materials of putrefaction are both more abundant and more prone to corruption. This is the moſt pernicious kind of impurity; for the mineral impregnations common in ſprings are ſeldom, in any degree, unwholeſome, and do not tend, like the other, to make the water corrupt. At many of the Weſt-India watering places the water is found ſtagnated juſt above high-water mark; and care ſhould be taken to go higher up to take it where it is running.

The pureſt water is apt to ſpoil by producing a putrid glare upon the inner ſurface of the caſk which contains it. There is a great difference in this reſpect between a new caſk, eſpecially if made of moiſt wood, and that caſk which has been hardened and ſeaſoned by age and uſe. Several contrivances have been propoſed for preparing the veſſels that hold the water; but none have been found by experience ſo effectual as letting them ſtand for ſome time full of ſea water; and it is a great advantage of this method, that it is ſo eaſily practicable.

It is in few places we meet with water ſuch as that of Briſtol, which, in clean veſ-

ſels,

ſels, may be kept for any length of time. We may conſider all water kept in wooden veſſels as more or leſs liable to putrefaction; but there is a ſubſtance, which is neither rare nor coſtly, that effectually preſerves it ſweet. This is *quick lime*, with which every ſhip ſhould be provided, in order to put a pint of it into each butt when it is filled. It is probably owing to the ſmall impregnation of quick lime found in Briſtol water that it is ſo incorruptible. It has the advantage of not being injurious to health; but, on the contrary, is rather friendly to the bowels, tending to prevent and check fluxes. In the year 1779 ſeveral ſhips of the line arrived in the Weſt Indies from England, and they were all afflicted with the flux, except the Stirling Caſtle, which was the only ſhip in which quick lime was put into the water; nor does it ſpoil the water for any culinary purpoſe. Its action in preventing putrefaction conſiſts, in part at leaſt, in deſtroying vegetable and animal life. An addition of putreſcent matter is produced in water by the generation of ſmall inſects; and the glare that collects on the ſides of caſks, and alſo what collects on the ſurface of the water, is a ſpecies of vegetation of the order called

by

by naturaliſts *algæ* *. Quick lime is a poiſon to this ſpecies of vegetable life as well as to inſects: but upon whatever principle it depends, the property of it in preſerving water ſweet is ſo well aſcertained, that it is inexcuſable ever to neglect the uſe of it.

Quick lime is equally efficacious for this purpoſe, whether ſlacked or unſlacked; and though the latter form is more convenient for ſtowage, by having leſs weight and bulk, yet the other is to be preferred for the ſake of ſafety; for if water ſhould by chance reach the unſlacked lime, a great degree of heat is thereby produced, which has been known to give occaſion to the moſt formidable accidents.

The only other objection I know of to the uſe of quick lime is, that it converts the water into a lime water, rendering it thereby diſagreeable to the palate and ſtomach: but the quantity neceſſary to preſerve it makes but a very weak lime water; for part of the lime is precipitated by the

* See an article in Rozier's Journal de Medicine for July, 1784, by Dr. Ingenhouſz.

mephitic

mephitic air, or the aerial acid, as it is otherwiſe called, of which there is ſome contained in the water. The accidental expoſure to the atmoſphere, which alſo contains this ſort of air, tends farther to leſſen the acrimony of the quick lime.

There are other ſubſtances which have been found uſeful in correcting bad water. Alum and cream of tartar, as antiſeptic bodies, have been employed for this purpoſe. Vinegar and the vegetable acid juices and fruits, ſuch as tamarinds, may be uſed occaſionally to take off the putrid offenſive taſte which may have ariſen in caſe the uſe of quick lime has been neglected. In the fleet under Sir Charles Saunders, the water of the river St. Lawrence having been found to produce fluxes, this quality was removed by throwing four pounds of burnt biſcuit into each caſk before it was uſed. But there is nothing ſo effectual, and ſubject to ſo few inconveniences, as quick lime.

The next method to be mentioned of purifying water is filtration, which not only ſeparates the groſs impurities, but removes the putrid ſmell and taſte. It is performed with

with a dripping ſtone, which is a convenient contrivance for officers, but cannot furniſh a ſupply for a whole ſhip's company.

When the water of wells or brooks is found loaded with mud, the following expeditious method of filtration, deſcribed by Dr. Lind, has been practiſed with ſucceſs: —Let a quantity of clean ſand or gravel be put into a barrel placed on one end, without the head, ſo as to fill one half or more of it, and let another barrel, with both ends knocked out, of a much ſmaller ſize, (or let it be an open cylinder of any kind) be placed erect in the middle of it, and almoſt filled with ſand or gravel. If the impure water be poured into the ſmall barrel or cylinder, it will riſe up through the ſand of both barrels, and appear pure above the ſand of the large one in the interval between it and the ſmall one.

But when water is offenſive in conſequence of being long kept, the moſt effectual and expeditious method of ſweetening it is by making air paſs through it, or by expoſing it to the air in as divided a ſtate as poſſible. Boiling will not expel the putrid effluvia

effluvia contained in water; but ſuch is the attraction of air for this offenſive matter, that the water need only be thoroughly brought in contact with it to be rendered quite ſweet. This is beſt done either by blowing through it, by inſerting the nozzle of the bellows into a tube, or by a machine invented by Mr. Oſbridge, a lieutenant of the navy. This conſiſts of a hand pump, which is inſerted in a ſcuttle made at the top of a caſk, and by means of it the water, being raiſed a few feet, falls through ſeveral ſheets of tin pierced like cullenders, and placed horizontally in a half cylinder of the ſame metal. The purpoſe of it is to reduce the water into numberleſs drops, which being expoſed in this form to the open air, is deprived of its offenſive quality. The ſame method will ſerve to ſeparate the ſuperfluous quick lime in the water. It is a machine very deſervedly in common uſe, and the working of it is a moderate and ſalutary exerciſe to men in fair weather.

The following contrivance will be found to afford a ſufficient ſupply of ſweet water to particular meſſes, and may be conſidered as an artificial and more expeditious ſort of

dripping ſtone. — Let the narrow mouth of a large funnel be filled with a bit of ſponge, over which let there be a layer of clean gravel or ſand covered with a piece of flannel, and over the whole another layer of ſand. Muddy or offenſive water being poured upon this, runs or drops out clear; and care muſt be taken to change the ſand, ſponge, &c. frequently, as they will become loaded with the impurities of the water *.

There ſhould be in every ſhip an apparatus for diſtilling water in caſe of diſtreſs. This conſiſts merely of a head and worm adapted to the common boiler, and diſtillation may go on while the victuals are boiling. More than eight gallons of excellent freſh water may be drawn off in an hour from the copper of the ſmalleſt ſhip of war †. I refer for a more particular account of

* See Dr. Lind on the Health of Seamen.

† The want of this apparatus may be ſupplied, in caſe of exigency, by a contrivance mentioned by Dr. Lind, conſiſting of a tea-kettle with the handle taken off, and inverted upon the boiler, with a gun barrel adapted to the ſpout, paſſing through a barrel of water by way of refrigeratory, or kept conſtantly moiſt with a mop.

In this place I cannot help mentioning alſo, that in caſe of great extremity it has been found that the blood may

of all this to the works of Dr. Lind, who was the original inventor and recommender of this method.

This invention ſeems to have eſcaped others ſo long, from the idea that the *deſideratum* in freſhening ſea water was ſome ſubſtance to be added to it while under diſtillation. No ſuch ſubſtance is neceſſary, and the more ſimple the mode of diſtillation, the freſher the water will prove.

Rain water at ſea is always pure and wholeſome, and may be ſaved occaſionally by means of a ſail or awning.

SECT. III.

OF CLOTHING.

NATURE has made man ſo defenceleſs, that even the rudeſt nations, in the hotteſt climates, in general, adopt ſome ſort of co-

may be diluted, and thirſt removed, by wetting the ſurface of the body even with ſea water, the vapour of which is always freſh, and is inhaled by thoſe pores of the ſkin whoſe natural function it is to imbibe moiſture, of which there is always more or leſs in the common air of the atmoſphere.

vering to guard themſelves from the weather. Man ſeems to be an exotic in temperate and cold climates, from its being neceſſary to his welfare and even exiſtence to procure warmth by art. We may affirm, that clothing is the moſt artificial circumſtance in the life of man: and there is none, of which the errors ſubject him to more inconvenience and hardſhip. Inſenſible perſpiration is performed by the pores of the ſkin, and being one of the moſt important functions of the body, the ſuppreſſion of it ſeems to be one of the principal cauſes, or at leaſt one of the moſt frequent attendants on feveriſh and inflammatory complaints; and one of the moſt common cauſes of this ſuppreſſion is the application of cold to the ſkin.

In order to keep up perſpiration, it is neceſſary that the orifices of the pores of the ſkin ſhould be bathed, as it were, in the vapour already ſecreted from them; and clothing ſeems to act in confining this, as well as in preventing the eſcape of the natural heat and the acceſs of the external air. Though the air ſhould not be cold, it will check

check perſpiration by carrying off this vapour and drying the ſkin. In the warmeſt climates, expoſure of the ſkin to the external air is unſafe to the native of cold and temperate climates; for it not only produces a feveriſh and uneaſy ſenſation at the time, but occaſions the moſt dangerous internal diſorders. In conſequence of the great ſenſibility and ſympathy of the body, and from the pores of the ſkin being open in a warm climate, expoſure is in ſome reſpects even more dangerous than in a cold one. Nothing is more apt to bring on the locked jaw and tetanus then ſleeping in the open air; and it was obſerved in Jamaica, that when it was the cuſtom to wear cotton and linen clothes, the dry belly-ache was much more common than now that it is the cuſtom to wear woollen cloth. Some particular conſtitutions may even require the uſe of flannel next the ſkin even in a hot climate, but it tends ſo much to weaken the body by exciting an exceſs of perſpiration, that it cannot be recommended as a general and indiſcriminate practice.

We know beſides, that the pores of the ſkin can abſorb not only the moiſture that

floats in the atmoſphere, but a variety of foreign bodies, whether noxious or medicinal, which may be applied to their orifices; and as the air is in certain places loaded with noxious matter, may not clothing be conſidered as a filter, as it were, to ſeparate the impurities of the air before it comes in contact with the ſurface of the body?

It is therefore every where of the utmoſt conſequence that ſufficient and ſuitable clothing ſhould be provided.

It would certainly be for the benefit of the ſervice, that an uniform ſhould be eſtabliſhed for the common men as well as for the officers. This would oblige them at all times to have in their poſſeſſion a quantity of decent apparel, ſubject to the inſpection of their ſuperiors. It would alſo be leſs eaſy to diſpoſe of their clothes for money without detection, and deſertion would alſo thereby be rendered more difficult.

It is of great conſequence that the purſer ſhould lay in a ſufficient ſtock of clothing and bedding ſuited to the climate for which the ſhip is deſtined, in order that there may be

be a ſufficient ſupply after having been on a diſtant ſtation for a certain length of time. I have known men ſuffer the greateſt inconvenience and hardſhip, and infectious diſeaſes kept up, from the neglect of this. Very great hardſhip and ſuffering, as well as ſickneſs, ariſes alſo in the paſſage to England in winter, from men not being furniſhed with warm clothing, upon coming into the cold latitudes after having been on a tropical ſtation. There is generally warm clothing in ſtore at the principal ports in the Weſt Indies, and a demand ſhould be made of a ſuitable quantity of it for ſhips on the point of ſailing to England.

The greateſt evil connected with clothing, is the infection generated by wearing it too long without ſhifting, for the jail, hoſpital, or ſhip fever, ſeems to be more owing to this than to cloſe air. The great importance of cleanlineſs appeared when we were treating of infection, from whence we may judge of what conſequence it is that men ſhould be provided with a ſhift of linen, as it is that part of the clothing that is in contact with the ſkin, which harbours infection *.

* When we conſider that linen was not in uſe among the ancient Romans, we might be apt to wonder that

As clothing is not the gift of nature, being left to man's own reaſon, it is ſubject to caprice, and thereby productive of inconvenience and diſeaſe. The neceſſity of it depends very much upon habit, like every thing elſe relating to the human body, and therefore ſudden and unſeaſonable changes of apparel are very unſafe to health. It is alſo found that a partial expoſure of the body is more pernicious than a general expoſure. If I were writing for the more delicate part of the world, I ſhould illuſtrate this by the danger of expoſing the feet alone to cold or wet. It is ſeldom that ſeamen are ſuſceptible to ſo great a degree, for their hardy and expoſed life ſteels them againſt ſuch impreſſions. But there is another circumſtance which renders it of the utmoſt conſequence, to defend the feet againſt external injury. It frequently happens, that,

they were not more unhealthy; but their ſubſtitute for this was frequent bathing, which not only ſerved to remove the *ſordes* adhering to the ſurface of the body, but to air that part of the clothing which was uſually in contact with the ſkin. The waſhing of the bodies of men ſuſpected of infection upon their firſt entrance into a ſhip, has already been mentioned, and I have known ſome commanders who made their men frequently bathe themſelves with great ſeeming advantage.

without

without any viſible ſymptoms of ſcurvy, the conſtitutions of ſeamen are ſuch, that, upon the leaſt ſcratch being received on the feet or legs, a large ſpreading incurable ulcer ariſes, which ſometimes ends in the loſs of a limb; but at any rate diſables them from duty till a cure can be effected by the uſe of a freſh and vegetable diet, or a change of climate. It is remarkable, however, that theſe ulcers ſeldom or never ariſe on the ſoles of the feet. Next to acute diſeaſes and ſcurvy, this is the moſt deſtructive complaint incident to a ſea life, particularly in a hot climate; and I have known great numbers of good men thereby loſt to the ſervice. It is, therefore, of the utmoſt conſequence that men ſhould not only be ſupplied with ſhoes, but be obliged to wear them, which is found to require a degree of compulſion; for in the Weſt Indies it is obſerved that ſeamen always wiſh to go barefooted.

CHAP. III.

Of Exercise and Fatigue.

IT commonly happens in a ſhip of war that a great proportion of the hands is landſmen; for, beſides the men required to navigate the ſhip, a great number is neceſſary to fight the guns, as well as for other duties; and as theſe duties admit of long intervals, their health may be affected by the want of exerciſe.

It has been obſerved before, that one uſe of frequent reviews and muſters in a numerous crew is, to call forth men that would otherwiſe be overlooked, to oblige them to come into the open air, to keep themſelves clean, and to prevent them from indulging in filth and lazineſs. It is remarked, that ſeamen are in general leſs ſubject to ſcurvy than marines and landſmen, which ſeems to be owing to the greater activity of their life and alacrity of their minds.

There is an eſſay on the cauſes of the peſtilence, by an anonymous author, publiſhed

at Edinburgh in 1759, in which this diſeaſe is ſaid to be entirely the offſpring of idleneſs; and he illuſtrates this by its being more apt to ariſe in beſieged towns than any other ſituation; and he alledges that a falſe alarm of the plague will actually produce it by throwing people idle, as was the caſe, he affirms, when the plague was laſt at Meſſina.

There are always numbers who have been preſſed into the ſervice, to whom a ſea life is new, and who are therefore prone to indolence, low ſpirits, and ſelf-neglect. Men of this deſcription are by far the moſt apt to fall into the ſcurvy; and next to the quality of the food, there is nothing contributes more to promote the ſcurvy than ſuch a diſpoſition. It is indeed both a cauſe and a ſymptom of this diſeaſe, and therefore idleneſs and *ſkulking* ſhould be rigidly diſcouraged, unleſs the complaint is ſo far advanced as to render it cruel and even impoſſible to force men to take exercise.

The Conqueror of 74 guns, one of our ſquadron in the laſt year of the war, was an inſtance of a ſhip in which only the prime

prime ſeamen were attacked with the ſcurvy, and this is to be accounted for upon the ſame principle, for it proceeded from their having been exempted from the duty of pumping, in which the inferior claſſes of men were conſtantly employed, owing to the leaky ſtate of the ſhip. Dr. Cooke, in a letter to Dr. Lind, remarks, that at Aſtracan the ſoldiers are more affected with the ſcurvy than the boors, and theſe more than the ſailors, though their diet is the ſame, and attributes this difference to the different proportion of exerciſe. All who have obſerved or written accurately on the ſcurvy, concur in confirming this fact, which is of the utmoſt conſequence, as indolence is a vice which it is ſo much in the power of officers to counteract.

As low ſpirits and indolence have ſuch an unfavourable effect upon health, it would be wiſe, as well as benevolent, to promote whatever produces jollity, contentment, and good humour, ſo far as is conſiſtent with ſobriety and regularity. There are certain rough ſports which are now almoſt in diſuſe; and whoever would revive and encourage them,

would

would perform a uſeful office to the ſervice.

A ſea life frequently demands violent temporary exertions, from the uncertainty of the weather, and other incidents; ſo that men are more expoſed to extreme fatigue and ſudden calls of duty in this than in any other ſituation of life. Nothing tends more to ſhorten life than exceſſive bodily labour and watching; and it is for this reaſon that ſeamen in general are ſhort lived, and that their countenance and general appearance make them appear older than they really are by ſeveral years. This is remarkably the caſe when a ſeaman comes to be upwards of forty; and it has been mentioned before, that a perſon not acquainted with this circumſtance will make a miſtake of ten years in gueſſing at the age of a ſeaman from his looks.

Fatigue being therefore frequently the means of bringing on diſeaſe and breaking the conſtitution, as much tenderneſs is due to men as is conſiſtent with the neceſſary duties of ſervice. This is a circumſtance in which young officers are apt to forget themſelves;

themſelves; and they ſhould take care how they *call all hands* wantonly, and oblige men to make exertions beyond their ſtrength, eſpecially as this will be ſubmitted to more readily by ſailors than any other ſet of men, from the generous alacrity of their nature.

It has already been mentioned, that fatigue, particularly in the heat of the ſun, is one of the moſt common exciting cauſes of fevers in hot climates; and it was remarked, that for this reaſon women and priſoners were in a great meaſure exempt from the malignant fevers incident to ſuch climates.

It would be well if it could be rendered convenient, at all times, except in caſes of danger or emergency, to put the men at three watches inſtead of watch and watch. By the former arrangement they have eight hours ſleep and reſt; by the latter only four hours are allowed, which is not ſufficient for refreſhment, nor is there time for them to get dry, in caſe they have been expoſed to wet.

It would be a good rule to have as few men

men as poſſible out of bed in the night-time, unleſs where active ſervice renders it neceſſary; for, if unoccupied, they lie about the decks, fall aſleep, and catch cold. In ſuch ſituations, might not all the topmen but one remain on the forecaſtle, where they might take exerciſe, which they could not do aloft? I am indebted for this remark to the Rev. Mr. Ramſay, who joins to a great knowledge of the ſea ſervice a warm and diſintereſted zeal for its proſperity, and has been ſo good in ſeveral other inſtances as to communicate to me the reſults of his experience and obſervation.

The good effects reſulting from the indulgent treatment of men are, that it encourages them to enter into the ſervice, and to do their duty with cheerfulneſs and reſolution. There is ſomething more daunting to the mind of man to ſee his companions ſuffering under oppreſſion and languiſhing in diſeaſe, or periſhing miſerably from ſores or ſickneſs, than in the terrors of fire and ſword, which, as we have ſeen, make the leaſt part of the calamities of war. The good treatment of ſeamen, in ſo far as it regards their health, is by no means incompatible

patible with ſtrict diſcipline. Indeed ſtrictneſs and even ſeverity is neceſſary with ſeamen; for it is obſerved with regard to men who are uſed to arbitrary government, that they cannot bear indulgence and relaxation. But the ſteady enforcement of diſcipline and regularity is ſo far from being akin to cruelty, that it tends to prevent not only ſickneſs but the commiſſion of crimes, and conſequently rendering the infliction of puniſhment leſs frequent and neceſſary. The chief excellence in the character of an officer, ſeems to conſiſt in uniting ſtrict diſcipline with indulgence and humanity.

CONCLUSION.

THE ſubject of the preceding remarks has been the prevention of diſeaſe, and it has appeared that the means of this are not ſo much in the province of the medical profeſſion, as of thoſe who are entruſted with the direction of the navy in a civil or military capacity; and that with regard to cure and recovery alſo, a great deal depends upon them,

them, by their having it in their power to make a ſuitable proviſion of proper diet and cordials. The great importance of the ſubject will plead my excuſe for again calling to mind, that ſuch attentions are not only dictated by humanity, but would be the greateſt wiſdom in an œconomical and national light, conſidering how expenſive it is to *replace* men and to ſupport invalids, not to mention that it is upon the health and lives of men that every public exertion eſſentially depends, and upon which may depend not only the character of officers, but the national character and ſafety on the day of battle.

It muſt be confeſſed, that though there is ſtill room for improvement, the navy is now on a better footing with regard to the health and comfort of ſeamen than it appears to have been in former times. The victuals were in general in the late war of excellent quality; the civil branch has ſhewn in many inſtances a readineſs to adopt the means and to furniſh the articles that were recommended for the health of the men *; and

* See Part I.

moſt of the commanders whom I have the honour to know are humane, attentive, and intelligent.

To conclude; there is no ſituation of life in which there is room for more virtues, more conduct and addreſs, than that of a ſea officer. The men are thrown upon his humanity and attention in more views than one: they are ſubject to a more arbitrary exertion of power than the conſtitution of the ſtate authorizes in civil life, Engliſhmen giving up into his hands, from conſiderations of public expediency, that which they hold moſt dear, and of which they are moſt jealous, their LIBERTY: it is the character of ſeamen to be thoughtleſs and neglectful of their own intereſt and welfare, requiring to be tended like children; but from their bravery, utility, and other good qualities, they ſeem entitled to a degree of *parental* tenderneſs and attention from the ſtate they protect and the officers they obey.

APPENDIX

APPENDIX TO PART II.

In order to exhibit a conciſe view of the moſt material obſervations contained in this part of the Work, a Memorial, delivered to the Board of Admiralty in October, 1781, is here ſubjoined.

MEMORIAL,

Propoſing Means for preventing the Sickneſs and Mortality prevailing among His Majeſty's Seamen in the Weſt Indies.

I HAVE for the two laſt years attended a ſquadron, conſiſting ſeldom of leſs than twenty ſhips of the line, in quality of phyſician to the fleet at Barbadoes and the Leeward Iſlands. I received, by the order of the Commander in Chief, a monthly return from the ſurgeon of each ſhip, ſetting forth the diſeaſes, deaths, and other circumſtances of the reſpective ſhips companies. I alſo ſuperintended the hoſpital of the place

where the fleet happened to lie when in port. Theſe advantages have afforded me an intimate knowledge of the nature and cauſes of the ſickneſs and mortality among the ſeamen, both on board of their ſhips and in hoſpitals.

It appears by my returns, that there died in the courſe of the twelve months preceding July laſt, on board of ſhips, ſeven hundred and fifteen ſeamen and marines, of whom only fifty-nine died in battle and of wounds. There died in the ſame time in hoſpitals eight hundred and ſixty-two: ſo that out of twelve thouſand one hundred and nine men, which is the ſum total of the complement of twenty ſhips of the line, there have periſhed in one year one thouſand five hundred and ſeventy-ſeven, that is nearly every ſeventh man.

There were alſo ſent to England in the ſame year, three hundred and fifty men, diſabled by lameneſs and chronic complaints, the greater part of whom will be for ever loſt to the ſervice.

The degree of ſickneſs is very different at

different times; but it appears by the returns, that, at a medium, there has been one man in fifteen on the ſick liſt.

Having employed all the attention of which I was capable to find out the cauſes of this ſickneſs and mortality, in order, if poſſible, to point out the means of prevention; I flatter myſelf with being able to aſſign the moſt general cauſes, and to propoſe ſome effectual remedies.

When it is conſidered that ſickneſs is almoſt entirely confined to ſhips of two and three decks, and that ſome of theſe are as healthy as frigates and merchant ſhips, though in the ſame circumſtances of ſervice with others that are extremely ſickly, we are led from hence to infer, that ſickneſs is not in its own nature unavoidable, and we are encouraged to hope, that the attainment of general health is within the compaſs of human management.

I humbly and earneſtly ſolicit attention to ſome of the moſt material obſervations and concluſions which have occurred in the courſe of a ſervice, which, though ſhort,

has been extenſive; and whatever is here propoſed has this recommendation, that it is eaſily practicable, and is no addition to the public charges.

Firſt: I hardly ever knew a ſhip's company become ſickly which was well regulated in point of cleanlineſs and dryneſs. It is the cuſtom in ſome ſhips to divide the crew into ſquads or diviſions under the inſpection of reſpective officers, who make a weekly review of their perſons and clothing, and are anſwerable for the cleanlineſs and regularity of their ſeveral allotments. This ought to be an indiſpenſable duty in ſhips of two or three decks; and when it has been practiſed, and at the ſame time ventilation, cleanlineſs, and dryneſs below and between decks, have been attended to, I have never known ſeamen more unhealthy than other men. The neglect of ſuch attentions is a never-failing cauſe of ſickneſs.

I would, therefore, with all becoming deference, ſuggeſt, that ſuch a regulation, inſtead of being left to the diſcretion of officers, ſhould be made a part of the public inſtructions. From ſome commanders, who already

already practiſe theſe rules, the advantage of them comes to be known; and would not a public ſanction not only render them general and permanent, but facilitate the duty of the officer, by making ſuch a regulation appear a matter of legal neceſſity, inſtead of his own arbitrary act?

Secondly: Scurvy is one of the principal diſeaſes with which ſeamen are afflicted; and this may be infallibly prevented, or cured, by vegetables and fruit, particularly oranges, lemons, or limes. Theſe might be ſupplied by employing one or more ſmall veſſels to collect them at different iſlands, and ſuch an expedient would prevent much ſickneſs, and ſave many lives. I am well convinced that more men would be ſaved by ſuch a purveyance of fruit and vegetables, than could be raiſed by double the expence and trouble employed on the impreſt ſervice; ſo that policy, as well as humanity, concur in recommending it. Every fifty oranges or lemons might be conſidered as a hand to the fleet, inaſmuch as the health, and perhaps the life, of a man would thereby be ſaved.

Thirdly: The uſe of wine, in place of rum, has been found extremely conducive to health. In the courſe of my obſervation I have met with the moſt unqueſtionable proofs of the benefit that would ariſe from this ſubſtitution. It is a farther reaſon for ſuch a change, that good rum is ſeldom or never ſupplied in the Weſt Indies.

Fourthly: The neceſſaries provided for the ſick by the preſent eſtabliſhment are not at all adequate, eſpecially on a diſtant ſtation, where the ſupply is not regular, and the quantity at beſt is ſuch as can contribute but little to their comfort and recovery. An ample proviſion might be made for the ſick, without any additional expence, in the following manner:

It is a rule in the ſervice, that though men are ſick, their ordinary allowance of ſalt meat and other victuals is nevertheleſs ſerved out, and is either uſed by the other ſeamen, who ſtand in no need of it, or is waſted. Now, if the purſers were inſtructed to provide themſelves with certain ſpecies of neceſſaries, ſuch as Madeira wine, ſugar, rice, and dried fruits, to ſerve to the ſick, in place

place of rum, and the common proviſions of the ſhip, ſuch a regulation would be productive of the very beſt effects, in recovering the health, and preſerving the lives of thoſe men who have the misfortune to be taken ill in a ſituation neceſſarily deſtitute of moſt of the comforts that can alleviate their ſufferings. I cannot help here applauding a late regulation, by which melaſſes are ſubſtituted for part of the oatmeal; for the quantity of the latter heretofore legally allowed was ſo much greater than what was neceſſary, that one half of it has commonly been waſted.

It is to be obſerved, in general, with regard to the Weſt Indies, that ſhips on ſervice are to be conſidered, in a great meaſure, in the light of ſhips conſtantly at ſea; for, excepting the iſland of Barbadoes, there is no other port in which freſh meat and vegetables can be procured in any quantity, and therefore ſour krout, melaſſes, and ſuch other articles of antiſcorbutic diet as can be ſupplied on board, are abſolutely neceſſary. Fleets could hardly exiſt here, were it not that a warm climate is naturally more unfavourable to the ſcurvy than a cold one.

Fifthly:

Fifthly: Though the health of a ſhip's company depends chiefly on diet, and that diſcipline and order which is the buſineſs of officers, yet much depends alſo on the medical art, particularly in the Weſt Indies; and as ſurgeons frequently cannot do juſtice to the men without wronging themſelves, in a country where the price of every thiug is exorbitant, and medicines often unſound, Government would find its account in ſupplying gratuitouſly ſome of the moſt coſtly articles, particularly Peruvian bark in a freſh ſtate from time to time, from England.

Sixthly: It is now the general cuſtom to ſend every ſick perſon on ſhore to an hoſpital; where there is frequently worſe air and worſe accommodation than on board, from overcrowding the apartments. Contagious diſeaſes, though not ſo common as in Europe, are here often mixed with thoſe that are not ſo, whereby numbers are infected and carried off; and, beſides this, the land air is infinitely more unwholeſome in the Weſt Indies than the air at ſea or in a road. The ſcurvy is perheps not at all contagious, nor is it very difficult of cure; but a number of caſes of it terminate fatally from the flux or fever,

fever, caught either by contagion in hoſpitals, by the noxious influence of land vapours, or by intemperance. I beg leave, therefore, humbly to ſuggeſt, that as few ſick as poſſible of any diſeaſe, but what is contagious, be ſent to hoſpitals, and that ſome method be eſtabliſhed for the ſupply of vegetables and other refreſhments to the ſick on board of their ſhips.

Seventhly: Crowding, filth, and the mixture of diſeaſes, are the great cauſes of mortality in hoſpitals. There ſhould be a ſpace of five hundred cubic feet allowed for each man; and in general the ſick had better remain on board than be crowded beyond that degree; or relief ſhould be provided to the hoſpital by an hoſpital ſhip, which, for reaſons already given, is preferable to any accommodation on ſhore; and ſuch an inſtitution would be more particularly proper for the reception of convaleſcent men.

I would beg leave, therefore, earneſtly to recommend that cleanlineſs, the ſeparation of diſeaſes, and a competent ſpace, be regularly enjoined and ſtrictly enforced in hoſpitals; and in order to make this more practicable

practicable in the great ſcale of ſervice now going on, I would farther propoſe that hoſpital ſhips be eſtabliſhed for the reception of the ſick or recovering. I know from extenſive experience and cloſe obſervation, that theſe circumſtances are more eſſential than even medicine and diet.

Theſe are a few remarks extracted from a ſeries of obſervations, and derived from great opportunities of experience. Many other remarks would ſuggeſt themſelves; but I purpoſely confine myſelf to what is highly important, and eaſily practicable, with little or no addition to the public expence. Some of the improvements recommended are indeed an immediate, and all of them will be an eventual, ſaving to the public.

The alterations that have been propoſed are,

1ſt, The eſtabliſhment of a certain method and diſcipline, in order to ſecure regularity and cleanlineſs among the men, and to render the ſhips clean and dry.

2dly, The ſupply of fruit and other vegetables for the cure of the ſcurvy.

3dly,

3dly, The ſubſtitution of wine * for rum.

4thly, The providing of an adequate quantity of neceſſaries for the ſick.

5thly, The gratuitous ſupply of certain medicines.

6thly, The curing of certain diſeaſes on board inſtead of ſending them to hoſpitals; and,

Laſtly, The preventing of filth, crowding, and the mixture of diſeaſes in hoſpitals, by proper regulations, and by eſtabliſhing hoſpital ſhips.

I beg leave again to call to mind, that 1,518 deaths from diſeaſe, beſides 350 invalids, in 12,109 men, in the courſe of one year, is an alarming waſte of Britiſh ſeamen, being a number that would man three of His Majeſty's ſhips of the line; and what I advance is from a real conviction that a due attention to the above-mentioned propoſitions would ſave more than two thirds of

* Had I then known the ſalutary effects of porter and ſpruce beer, of which I have ſince been convinced, I ſhould have propoſed them as ſubſtitutes for rum.

the

the ſeamen that would otherwiſe die in that climate. It was to ſet this in a proper light that I requeſted leave to quit my duty during the abſence of the greater part of the ſquadron in the hurricane months: and ſhould any thing I propoſe meet with public approbation, and be carried into effect, I ſhould eſteem it a recompence far above any other gratification I can derive from the ſervice.

LONDON,
October 13, 1781.

To the Right Hon. the Lords Commiſſioners
of the Admiralty.

Next year the following Supplement to the preceding Memorial was ſent to the Board of Admiralty:

SUPPLEMENT to the MEMORIAL delivered laſt Year to the Board of Admiralty.

SINCE my return to my duty on this ſtation, additional experience has afforded me farther practical confirmation of the utility of the former propoſals.

The

The great ſquadron employed on this ſtation has, by the attention of the Commiſſioners of Victualling, and alſo of the Commander in Chief, been ſupplied with moſt of the articles recommended, in ſuch quantities as to prove their efficacy; and indeed the ſmall degree of mortality in compariſon of former times, is a ſufficient demonſtration of this.

I beg leave to give an inſtance, in the Formidable, of the great and ſalutary effects of the propoſed improvements. This ſhip left England, furniſhed not only with ſour krout and melaſſes, in common with moſt others in the ſquadron, but what was peculiar to herſelf was, an entire ſupply of good wine in place of ſpirits; and an experiment has been made in this inſtance, under my own eye, to aſcertain what degree of health it was poſſible to attain in a great ſhip in this climate. With the above advantages, together with good diſcipline and medical care, no man * died of diſeaſe from December,

* The authenticity of this fact, as well as every other aſſertion in this work relating to the mortality in the fleet, may be proved from the ſhip's books, depoſited at the Navy Office.

1781,

1781, to May, 1782, and only thirteen were ſent to hoſpitals, whoſe complaints were ſmall pox and ulcers. In the months of May and June laſt, when at Jamaica, there died of diſeaſe in this ſhip three men, and ſeventeen were ſent to the hoſpital, moſt of whom had contracted their ſickneſs on board of French prizes.

In the reſt of the fleet the health was in proportion to the wine and other refreſhments, and the cleanlineſs, good order, and diſcipline obſerved.

In the ſquadron I attended the laſt five months, which ſeldom conſiſted, during the laſt three months of that time, of leſs than forty ſhips of the line, there have died of diſeaſe about 350 men, and about 1,000 have been ſent to hoſpitals; a degree of ſickneſs and mortality which, though not greater than what frequently prevails in Europe, I am perſuaded would have been ſtill leſs, had the improvements propoſed been complied with in a manner more extenſive and complete, and had the general rules of diſcipline and cleanlineſs been kept up with due and equal ſtrictneſs throughout the fleet.

This

This laſt article, which, being the moſt important, I have placed firſt in the preceding memorial, it is only in the power of ſupreme authority to enforce; and my additional experience and obſervation have ſo far confirmed me in the opinion of the utility of this, as well as the other articles, that I hope to be again pardoned for repeating my humble and earneſt ſolicitations that theſe regulations may be farther extended and enforced.

FORMIDABLE,
At Port Royal, Jamaica,
July 16, 1782.

PART III.

DESCRIPTION AND TREATMENT OF THE DISEASES MOST COMMONLY OCCURRING AT SEA.

IT was mentioned in the Introduction to this work, that though my opportunities of experience were extenſive, ſeveral obſtacles had prevented me from making obſervations ſo accurately as could have been wiſhed. Theſe were chiefly the bad accommodation of the ſick at ſome of the hoſpitals, and the ſhortneſs of our ſtay at any one place, which ſeldom exceeded ſix weeks or two months, and prevented me from completing ſuch obſervations as I happened to be engaged in. But having practiſed among great numbers, obſervations neceſſarily aroſe from the compariſon of ſo many caſes; and amidſt the variety of ſituations connected with

with the emergencies and hardſhips of war, nature is ſeen in certain poſitions and under certain trials which are not met with in common life. I ſhall therefore deſcribe the diſeaſes ſuch as they occurred, and ſhall add ſuch remarks on practice as I could aſcertain.

The following obſervations ſhall be confined chiefly to what I have called the ſea epidemics, viz. Fevers, Fluxes, and the Scurvy.

CHAP. I.

Of FEVERS.

THOUGH it is impoſſible to refer every particular caſe of fever to a diſtinct claſs, on account of the mixed and anomalous ſymptoms that ariſe, yet there are certain diſtinguiſhing features which afford ſufficient ground for dividing them into different kinds, and ſuch a diviſion will at leaſt ſerve to facilitate deſcription, and ſerve as an outline in laying down the principles of practice.

The fevers which occurred moſt frequently on board of ſhips, and at naval hoſpitals belonging to the fleet in which I was employed, were the infectious ſhip fever, (which is the ſame with the jail and hoſpital fever or typhus) the bilious remitting fever, and the malignant yellow fever.

1. Of

1. Of the infectious SHIP FEVER.

This does not occur ſo frequently in hot as in cold climates, both becauſe it is the diſeaſe of ſhips newly fitted out, which they ſeldom are in the Weſt Indies, and becauſe there is ſomething in the warmth of a climate which prevents the production of contagion, as has been formerly remarked. But as great fleets arrived from time to time in the Weſt Indies from Europe, with numbers of men labouring under this fever, there were ſufficient opportunities of making obſervations upon it.

It has been ſo well deſcribed by Sir John Pringle, Dr. Lind, and other writers, that it is unneceſſary to enter into a minute detail of all its different appearances in its ſeveral ſtages; and I ſhall content myſelf with recounting ſome of the moſt diſtinguiſhing ſymptoms, and with marking the peculiarities that aroſe from the influence of the climate.

This fever is extremely various in its ſymptoms and in its degree of malignity

and fatality. We are told in ſome of the hiſtories of the jail diſtemper, that, upon its firſt attack, few eſcaped that were ſeized with it; but that afterwards it grew more mild; and it has been already obſerved, that the contagious poiſon of fever differs from that of ſmall-pox and other ſpecific infections, by varying in its degrees of virulence.

There are, however, certain characteriſtic ſymptoms pretty conſtant in this fever in all its forms.

One of the moſt remarkable of theſe is a greater degree of muſcular debility than what takes place in other fevers, and it deſerves to be mentioned firſt, as being one of the moſt conſtant. It is alſo a tolerably true index of the degree of malignity, the danger being in proportion to this ſymptom. In the more advanced ſtages of the fever, a tremor of the hands, and of the tongue when put out, is a conſtant ſymptom, and ſeems to be connected with this weak ſtate of the muſcular fibres. I have ſeen, however, extreme debility without tremor in caſes too of the greateſt danger, and it was obſervable in theſe that there was little or no delirium.

Another

Another ſtriking character of this fever is the delirium of a particular kind which uſually attends it. Senſation and reaſon are here in a ſtate uncommonly depraved; and it is in this ſort of fever oftener than any other that we find a total deprivation of them in the ſymptom called *coma*. The delirium is ſeldom of a wild, ungovernable kind, ſuch as occurs in inflammatory continued fevers, in the violent paroxyſms of intermitting and remitting fevers, or in inflammations of the brain. It is, however, connected with great ſuffering; and this conſiſts in anguiſh rather than pain, ſhewing itſelf by outward tremor, agitation, and what is called the *floccorum collectio*; alſo by ſighing, mumbling, and moaning, ſymptoms always indicating danger.

Delirium is a ſymptom, to the nature and appearances of which I have been particularly attentive, in conſequence of a painful and diligent attendance upon ſome caſes in which I was particularly intereſted from friendſhip and affection, and in which this was a remarkable ſymptom. It ſeems chiefly to conſiſt in a falſe reference of our ſenſations, whether external or internal; and this

is in no ſort of fever more evident than in this. When any painful impreſſion, for inſtance, is made by an external body, the patient, if in a ſtate of delirium, does not refer it juſtly to the part affected; but the general agitation and incoherence of ſentiments is aggravated for the time. I have known a degree of heat applied to the extremities ſufficient to bliſter them, yet the part did not ſhrink, though the raving and general uneaſineſs were increaſed. In like manner, with regard to internal ſenſations, when an irritation is excited to expel the urine or *feces*, the mind does not recognize it as ſuch, but from a ſenſe of uneaſineſs, probably miſtaken for ſomething elſe, an effort is made to relieve nature, which is done without a proper conſciouſneſs, and certain ſymptoms are produced which are well-known marks of danger in this fever. In watching thoſe who have been under the influence of delirium, I have obſerved it increaſe when any particular want of nature urged, and this would continue for ſome time, the patient being incapable of procuring himſelf immediate relief on account of the falſe reference of ſenſation that has been mentioned; but he would become calm after

after voiding the urine or *feces*, or after receiving ſomething to drink, according to the particular want that was preſent at the time. So great is the diſorder in the common courſe of ſenſation in this fever, that a perſon ill of it has been even unconſcious of inflammations of vital parts, which, in the natural ſtate of the nerves, would have excited the moſt acute pain, and would have been diſtinctly referred to the part affected, but were not diſcovered nor ſuſpected till inſpection after death*. I remember one caſe in which there were found large eroſions, and even holes in the inteſtines, without any preceding complaint that could have led to ſuſpect ſuch an appearance. It would appear that the motions excited in the brain and nerves in ſuch caſes, inſtead of producing the ſenſations naturally belonging to

* I fancied that my reaſoning on this ſubject was in a great meaſure new; but I lately met with the following paſſages in Celſus and Hippocrates, which ſeem to be illuſtrative of the ſame idea:—Quibus cauſa doloris, neque ſenſus ejus eſt, his mens laborat. Celſus, Lib. ii. cap. vii. which is nearly a tranſlation of the following aphoriſm of Hippocrates:—Ὁκοσοι πονεοντες τι τῦ σώματος, τὰ πολλὰ των πονων ὐκ αἰσθανοντα, τετεοισιν ἡ γνώμη νοσεει. Hippoc. Aphor. Lib. ii. Aphor. 6.

them,

them, ſerve to excite diſagreeable emotions of a different kind, in which delirium conſiſts. It ſeems to be from the ſame depraved ſtate of ſenſation, that when a phthiſical perſon is ſeiſed with this ſort of fever, his cough is for the time ſuſpended. I have ſeen the ſame circumſtance occur in a maniacal caſe. From a like cauſe it ſometimes happens in dangerous caſes of fever, that in the height of delirium the *epiglottis* loſes its natural irritability, ſo that liquids in the act of ſwallowing are apt to get into the windpipe, ſo as to excite coughing and threaten ſuffocation, as I have obſerved in ſome caſes that came under my care.

It ſometimes happens, as I have obſerved in watching cloſely the workings of delirium, that the patient not only makes a ſubſtitution of one ſuffering for another in his own perſon, but transfers it to another, fancying that it is ſome by-ſtander or ſome abſent friend who is the ſubject of ſuffering, and his own diſtreſs ariſes from ſympathiſing with him. In this caſe he may be ſaid to loſe his ſenſe of perſonal identity or individuality.

All

All theſe different forms of delirium are ſigns of a body extremely diſordered in its functions, and forbode great danger.

The next ſymptom I ſhall mention as moſt characteriſtic of this ſort of fever is, the ſpots known by the name of *petechiæ* and *vibices*, which, though far from being conſtant, are, perhaps, more peculiar to it than any other ſymptom. They occur only in the latter ſtages of the diſeaſe, and in caſes of conſiderable danger. The common opinion concerning their cauſe is, that the blood is in ſuch a diſſolved ſtate, that the red part of it is effuſed into the cellular membrane. The appearance in ſuch bodies as I have inſpected, ſeems to favour this opinion; for there was hardly any coagulation of the blood in the great veſſels, and inſtead of thoſe firm ſubſtances, called *polypi*, in the heart, there were only ſoft grumous bodies, which were ſo tender in their conſiſtence, that, upon being handled, they, as it were, diſſolved. Since the improved method of treating theſe fevers has been generally adopted, this ſymptom ſeldom occurs; for in moſt caſes it may be called an artificial

artificial ſymptom, chiefly ariſing from cloſe apartments, and the heat of bed clothes.

It may be conſidered as a peculiarity of this fever, that it is more indefinite in its criſis than moſt others. In continued fevers of the inflammatory kind, there are frequent attempts at remiſſion, there are certain periodical exacerbations, and there is generally a diſtinct criſis marked by a freedom of the ſecretions and turbid urine: but in the fever of which we are treating, though the patient is generally ſomewhat worſe towards the evening and during the night, its courſe is more equable, and the tranſition from ſickneſs to health is inſenſible and gradual, being ſeldom marked with any perceptible criſis.

The ſymptom next to be taken notice of, though a minute one, is very conſtant and characteriſtic in this ſort of fever. It is a peculiar heat in the ſkin, communicated to the hand of another perſon. It is uſual to graſp the wriſt of the patient after feeling his pulſe, in order to examine the ſtate of the ſkin in point of heat and moiſture; and in

in doing this a glow of heat is impreſſed on the palm of the hand, which laſts for ſome hours, if one ſhould neglect ſo long to waſh the hands. I have never met with this ſymptom in any of the ſporadic fevers of England, though I am informed it ſometimes occurs in theſe.

The fever we are treating of differs alſo from the ſporadic nervous fever of England, and from moſt others of the continued kind, in being attended with a more copious ſecretion of bile, which, when thrown up, is generally green, or, as it is otherwiſe called, of a porraceous colour. This ſymptom takes place in all climates; but is more remarkable in a hot climate, as might be expected.

Theſe are the chief characteriſtic ſymptoms of this fever. I ſhall next point out ſuch modifications of it as occurred in the Weſt Indies from the influence of climate.

In the firſt place, when this fever prevailed on board of any ſhip that arrived from a northern climate, it was ſoon after ſucceeded by, or, as it were, converted into, a dy-

ſentery; for thoſe ſhips that arrived either from England or North America with the greateſt ſtock of feveriſh infection, were the moſt ſubject to fluxes, after being two or three months in the Weſt Indies. This was formerly made uſe of as an argument, to prove that the dyſentery proceeds from the ſame cauſe with fever, taking a different determination, from circumſtances of climate, conſtitution, and accidental infection.

Secondly, It ſometimes happens that men, under the influence of this infection, are more apt than others to be affected with ſymptoms peculiar to the climate upon their firſt arrival. A very ſtriking inſtance of this has been mentioned in the caſe of men that were preſſed into the Formidable at New York, ſome of whom had the common ſhip fever on the paſſage; others, upon our arrival at Barbadoes, were ſeized with the yellow fever, and were the only men in the fleet who had it at that time. There was another inſtance in the recruits brought from England by the Anſon, who were ſeized with a fever on board of the Royal Oak; and in this fever the ſkin and eyes

were

were yellow, though without any ſymptoms of malignancy *.

Thirdly, It happened in ſome ſhips † that the infection was kept up for ſeveral months after arriving in the climate, from a neglect of cleanlineſs, or the want of an opportunity of removing thoſe who were infected to an hoſpital. It did not in theſe take a dyſenteric turn, as in moſt of the other ſhips; but differed from the ſhip fever of colder climates, as above deſcribed, in ſome particulars, which I ſhall here enumerate. All the ſymptoms were milder: it was more protracted, and leſs dangerous. In the beginning there was but little difference, only the ſymptoms were leſs violent; but in the ſucceeding period of the diſeaſe the pulſe deviated very little from the natural ſtandard, and the ſkin felt cold and clammy. The tongue was white; and this did not ſeem ſo much owing to any fur covering it, as to its being itſelf of a pale, lifeleſs colour, as well as the face, and it appeared larger in ſize than natural. The teeth were clogged

* See page 148.

† See pages 86 and 87.

with

with a white fur. Thoſe affected with this fever were ſubject to faintings, and had a conſtant uncomfortable languor and liſtleſſneſs. Moſt of them had a deep-ſeated pain in the occiput, and an oppreſſion at the ſtomach, but without any inclination to vomit. The unfavourable ſymptoms were *coma*, *delirium*, and a yellowneſs of the ſkin. I never remember to have ſeen *petechiæ* in any of them. The favourable ſymptoms were a warm moiſture, or a miliary eruption on the ſkin, and a gentle *diarrhœa*, which, however, if neglected, was in danger of degenerating into an incurable flux. A great number were ſeized with this fever in the Alcide, in July, 1783, and what is remarkable, moſt of them had the tape worm, as I was informed by Mr. Telford, the ſurgeon of that ſhip, who frequently obliged me with valuable remarks; and he obſerved alſo, that it was evidently infectious, and that the ſkin communicated the ſame diſagreeable feeling to the hand as was mentioned above.

Though the inflammatory fever does not often occur in hot climates, yet, as it is of great conſequence to diſtinguiſh it in all caſes

caſes from the infectious fever of which we are treating, it may not be improper, nor uninſtructive, here to point out the moſt remarkable differences. There is more reſemblance in their ſymptoms, eſpecially towards the beginning, than might at firſt be ſuppoſed; and as it is very material to avoid error with regard to the practice, which, in theſe two ſorts of fevers, ought to be very different, and even oppoſite, I have taken particular pains to diſcriminate them.

The continued inflammatory fever is very uncommon in the Weſt Indies; but in the form in which I have met with it in North America and England, there are caſes in which the blood is ſizy during the whole courſe of the diſeaſe, even without local affection, though, in general, there is more or leſs rheumatiſm, or pulmonic inflammation. The ſymptoms which chiefly diſtinguiſh ſuch caſes from the fever before deſcribed are, a greater degree of muſcular ſtrength, a more violent delirium, pale urine, a more parched tongue, and ſkin, greater heat and thirſt, and a pulſe more frequent and ſtrong, with a particular ſharpneſs. There is another ſymptom ſometimes

occurring, which I conſider as ſtrongly characteriſtic of a fever of an inflammatory nature. This is a watery diarrhœa, without *fæces* and without gripes, the ſtools conſiſting chiefly of the drink as it was taken in. There ſeems here to be a ſuſpenſion of the power of abſorption as well as of ſome of the ſecretions in the bowels, for there is hardly even bile or mucus in the ſtools. There is alſo a particular appearance of the mouth connected with this type of fever, which is better learned by the eye than by deſcription. It conſiſts chiefly in a want of moiſture on the lips, and a dryneſs and ſhining appearance of the teeth. With theſe ſymptoms, it will be found that the patient will bear the lancet in very advanced ſtages of the diſeaſe. Theſe fevers ſeldom occur but in a ſporadic way, unleſs when there is ſome peculiarity of ſeaſon, as at New York in autumn, 1782. They are alſo more frequent among the better than the lower ſort of people *.

By

* It ſeems probable that the principal difference of the inflammatory fever and the low fever conſiſts in the different degrees of tenſion in the vaſcular ſyſtem. All the ſoft fibres in a living animal body, but eſpecially thoſe

By comparing theſe ſymptoms with thoſe of the infectious fever above deſcribed, there will appear an obvious difference in their nature, and evident reaſons for varying their treatment.

TREATMENT of the SHIP FEVER.

WHEN the body is thrown into diſorder by an attack of fever, the firſt ſtep to be taken is to clear the ſtomach and bowels of their crude and acrid contents, conſiſting either of the food imperfectly digeſted, or the depraved natural ſecretions. So great is the diſturbance produced by ſuch offending matter, that, when nature is freed from this embarraſſment, the functions of the body

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thoſe of the muſcles and blood veſſels are at all times in a ſtate of more or leſs tenſion, ſo that if mechanically divided, they would ſhorten themſelves. An inflammatory ſtate of the body conſiſts in an increaſed degree of this tenſion in the vaſcular ſyſtem, producing ſtronger action and increaſed heat, and it is removed by thoſe remedies which evacuate and relax; ſuch as blood-letting, neutral ſalts, and antimonials. It might be ſhewn that other diſeaſes depend on a morbid laxity of the vaſcular fibres; but this would lead to a diſcuſſion too long for this place. See Baglivi *de fibra motrice et de morbis ſolidorum.*

body are frequently by this alone reſtored to their proper exerciſe, and a remiſſion produced. It ſeems probable alſo, that this evacuation proves ſalutary not only by removing the morbid ſtimulus, but by preventing the abſorption of corrupted or ill-concocted juices into the maſs of blood, which would tend ſtill farther to derange the functions of life. But perhaps the circumſtance that firſt ſuggeſted the utility of evacuating the ſtomach, as the firſt ſtep in the cure of fevers, was the nauſea ſo common in the beginning of them, which may be conſidered as a natural indication of this practice. It farther appears rational, that, as acute diſeaſes generally come on ſuddenly, and find the body in a ſtate of repletion from the recent *ingeſta*, the moſt obvious means of relief ſhould be to free the bowels, and particularly the ſtomach, from what is foreign and oppreſſive to it. It ſeems alſo probable, that the *nauſea* and the act of vomiting have a ſalutary effect independent of evacuation; for I have ſeen relief produced from theſe when nothing was evacuated. Such, indeed, is the great and univerſal influence and ſympathy of the ſtomach, that the operation of vomiting affects every fibre

of

of the body, and has been known to reſolve tumors in the moſt diſtant parts. Nauſea, by whatever means it is produced, tends to relax all the fibres of the body, and while it continues, the pulſe is always ſlower. An early adminiſtration of an emetic is therefore the firſt ſtep to be taken in the treatment of this as well as moſt other fevers.

If it is given in ſmall divided doſes, it will moſt probably evacuate the bowels downwards; and the moſt convenient form for this purpoſe is a ſolution of emetic tartar. If it ſhould not have this effect, ſome briſk purgative medicine ſhould be given ſoon after the operation of it.

I mention theſe evacuations before bloodletting; for though this ought to be firſt in thoſe caſes in which it is proper, it is here ſeldom neceſſary, and we may pronounce it to be a remedy very ill adapted to this ſort of fever, particularly in a hot climate. It ſometimes happens, however, that there is violent head-ach, pain of the back and limbs, with a throbbing pulſe. Theſe ſymptoms may in the very beginning juſtify bloodletting; but as they are only ſymptoms of

general fever, they cannot be ſaid to demand it, unleſs there is at the ſame time local inflammation.

The next means of relief I ſhall mention, and alſo the moſt probable means of cutting ſhort the diſeaſe, is to excite univerſal ſweat. This being an imitation of nature, is founded on reaſon as well as experience; for it is by ſweating that the fit of an intermittent is relieved and terminated; and continued fevers in general, if not always, begin with a fit of the ſame kind. A dry ſkin, accompanied with heat, is one of the moſt conſtant as well as troubleſome and uneaſy ſymptoms in all fevers; and it would appear from the peculiar heat of the ſkin in this ſort of fever, that there is either a more than common acrimony of the matter of perſpiration, or ſomething peculiar in the mode of circulation on the ſurface of the body. Sweating does not ſeem to operate entirely by the evacuation of acrimony, for no relief is procured by it if it is partial; and it is evident from a number of facts that the ſtate of the brain and *viſcera* depends on that of the external ſurface of the body; for a free ſtate of the pores of the ſkin,

ſkin, provided it is general, tends more than any other circumſtance to relieve internal pain, and alſo to take off delirium. The good effect of ſweating ſeems, therefore, chiefly to depend on a general relaxed ſtate of the ſmall veſſels on the ſurface of the body; and it ought to be effected, if poſſible, by gentle, ſoothing means, and not by ſuch regimen and medicines as heat the body and accelerate the circulation. This intention is beſt anſwered in the beginning by moderate doſes of antimonial medicines, and either the *antimonial powder, or tartar emetic may be employed. The firſt is a more certain ſudorific, being leſs apt than the other to run off by the bowels; and its effect will be ſtill more certain, if accompanied with a mild opiate, rendered diaphoretic by †*ſpiritus Mindereri*, which will both prevent the antimonial from acting roughly, and will determine its operation to the ſkin.

* The antimonial powder of the laſt edition of the London Pharmacopœia, has, during this war (1798) been ſubſtituted for the James's powder, and found to anſwer equally well; but being one third ſtronger, ought to be given in doſes proportionally leſs.

† The aqua ammoniæ acetatæ, of the laſt edition of the London pharmacopœia.

A ſweat kept up by theſe means, together with plentiful warm dilution, from twelve to twenty-four hours, is the moſt probable means of bringing about a complete remiſſion of the fever; and in this caſe a freſh acceſſion is to be prevented by the immediate adminiſtration of the bark.

Theſe are the means proper for ſtopping the fever in the beginning, or tending to render its future progreſs more ſafe; and though, with this view, free evacuations have been recommended, yet, if the fever ſhould go on, great caution is neceſſary in this reſpect in the future treatment, debility being the ſymptom chiefly to be guarded againſt. Purgatives may, indeed, be occaſionally neceſſary, in conſequence of accumulations of bile taking place; but, in general, the evacuations by ſtool ſhould not be more frequent than in health; and ſome of the caſes which were moſt unmanageable and fatal, were thoſe in which there was a ſpontaneous *diarrhœa*. With regard to bloodletting, it is always hurtful after the firſt two days, unleſs ſome inflammatory affection of a vital part ſhould ariſe.

The

The natural evacuation, which may with moſt ſafety and advantage be ſolicited and encouraged in this diſeaſe, is, that by perſpiration: and it is obſervable, that in thoſe caſes for which nature does moſt, there is a univerſal warm ſweat, which has generally a very offenſive ſmell, and ſeems to be a ſalutary effort of the conſtitution to cure the diſeaſe. Where this takes place, little medical aſſiſtance is neceſſary, except to keep it up chiefly by warm dilution; and there is no circumſtance in which the judgement of a phyſician is ſhewn more than in diſcerning thoſe caſes in which his chief buſineſs is to look on, where nature, being equal to the taſk, ought not to be diſturbed by the active and officious interpoſition of art. We ſhould not, however, aim at producing a profuſe ſweat, except with a view to effect a remiſſion immediately after the firſt evacuations. In the courſe of the diſeaſe, it is only neceſſary to keep up a gentle moiſture or ſoftneſs of the ſkin.

The head being particularly affected in this ſort of fever, the patient is extremely reſtleſs and delirious, eſpecially at night; and there is a medicine which has a moſt pleaſing

pleaſing effect in procuring both reſt and perſpiration. This is a combination of an opiate with an antimonial medicine, which was adminiſtered in the evening with great ſucceſs; and the ſudorific effect is rendered more certain by the addition of ſome ſaline neutral, eſpecially *ſpiritus Mindereri*. I tried pure opiates in the early ſtage of this fever, but found them not to anſwer; though in the low fevers of England, and in the advanced ſtages and convaleſcent ſtate of this fever, they are extremely ſafe and uſeful. This, as well as every other point of practice muſt be varied and modified according to the conſtitution, previous habits, and external circumſtances. In England, for example, it is found that we can with propriety give opiates in the early ſtages of this fever to the lower orders of people who have been accuſtomed to low living and hard labour, but that antimonial, ſaline, and evacuant remedies are neceſſary to the more affluent, at the ſame ſtages of this deſeaſe. The diverſity obſervable in the operation of this medicine may alſo in part be owing to this circumſtance, that opium of all other drugs, is moſt various in its effects upon the conſtitutions of individuals. Pure

laudanum is alſo given by Dr. Lind, at Haſlar, with great ſucceſs in the height of the diſeaſe; but in the Weſt Indies there is a greater tendency to acrid excretions, and the effect of pure opium in cauſing a retention of theſe, ſeems to be the cauſe of its more frequently diſagreeing in that climate in the firſt ſtage of this fever.

It may here be obſerved, that the addition of a little neutral ſalt alone will ſometimes ſo qualify the operation of opium, as to prevent its bad effects, ſuch as the increaſe of febrile heat and delirium, and the ſtupor and head-ach which, when given alone, it frequently induces the following day. I have generally employed nitre with this intention; but this does not ſeem ſo well adapted to this deſeaſe as ſome other neutral ſalts, as it tends too much to lower the powers of life.

But with a view to perſpiration, the *ſpiritus Mindereri* is the moſt effectual neutral medicine when conjoined with an opiate, and there is not, perhaps, a more ſafe and pleaſing diaphoretic known than a combination of it with ſyrup of poppies. There is

ſome

ſome neutral ſalt in * Dover's powder, and this has more effect than could be expected from ſo ſmall a quantity of an inert medicine; for I know from trials of my own, as well as thoſe of others, that ipecacuanha and opium given together, in the proportions preſcribed in that powder, will not have the ſame effect as when joined with the neutral ſalt. This is an inſtance of thoſe uſeful combinations of medicines which can be diſcovered only by experience, but which every phyſician ought gladly to adopt in practice upon good teſtimony and fair trial, though he may not be able to account for their effects, nor to explain their mode of operation. It is probably by reducing the heat and diminiſhing the action of the vaſcular ſyſtem, that neutral ſalts and ipecacuanha render opium applicable in the caſes mentioned above.

It is important that there ſhould be plentiful warm dilution; and the infuſion of ſauge, or any ſuch light aromatic, is rather more proper than farinaceous decoctions, or any compoſitions in which there is wine or ſpirits. Succeſs in this, as well as other

* The *Pulvis Ipecacuanhæ compoſitus* of the preſent London Pharmacopœia.

diſeaſes,

diſeaſes, depends on attention to nurſing as much as upon medicine; for what would it avail here to adminiſter medicines for promoting perſpiration, unleſs they were aſſiſted with fluids to allay thirſt, to dilute the acrimony in the firſt paſſages and in the veſſels, and to furniſh the materials of free perſpiration?

But however deſirable it may be to procure ſweat, this is never to be attempted by cloſe rooms and bed clothes, nor at this ſtage of the diſeaſe, are heating medicines, ſuch as volatile ſalts, ſerpentary, ſpirituous tinctures, or aromatics adviſable, though ſometimes very uſeful in the low and advanced ſtate of it. All theſe ſtimulating methods and medicines do at this time, according to the teſtimony of Sydenham, tend to increaſe the heat and delirium, and to produce *petechiæ*, miliary eruptions, or local inflammations. In the intervals of the anodyne diaphoretic above deſcribed, *ſpiritus Mindereri* and ſmall doſes of camphor, with proper dilution, may be ſafely employed to procure a ſoft ſkin. The principal virtues of camphor are thoſe of a cordial and diaphoretic. It ought to be given diſſolved in a watery vehicle, for in a ſolid form, as that of a bolus, it proves offenſive and irritating to the ſtomach.

The

The only other means I ſhall mention with this view is, the application of warm moiſture to the ſurface of the body, which may be done by ſoaking the feet and hands in warm water, or by fomenting the feet and legs with ſtupes. This does not anſwer except where there is a ſoft pulſe and no great increaſe of heat. Warm pediluvia is manifeſtly hurtful in inflammatory affections, particularly thoſe of the lungs. Where this operation is proper, it has the effect of bringing on a general relaxation on the ſkin, thereby taking off febrile agitation and delirium, and inducing ſleep. It muſt be remarked, however, that this practice would be improper in the inflammatory fever above deſcribed, by its tendency to ſtimulate the circulation and increaſe heat*.

Delirium is one of the moſt conſtant and alarming ſymptoms in this diſeaſe, and the removing

* The only other remedy worth notice in theſe continued fevers, is the affuſion of cold water; but as I have no proper experience of it myſelf, I have made no mention of it in the text. There is a treatiſe lately publiſhed on this ſubject by Dr. Currie of Liverpool, who ſeems to have judiciouſly diſcriminated the caſes in which it is applicable;

removing of it depends much upon the attendants as well as the phyſician. It has been ſaid before, that it depended on a falſe apprehenſion of the impreſſions or natural ſenſations.

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applicable; and as the attention of the public is at preſent much awake to it, it will probably be ſoon decided whether it is really a valuable remedy, or only one of thoſe to which novelty and faſhion give a temporary currency. The only reports with regard to its employment in this fever from practitioners connected with the ſea ſervice, are thoſe of Dr. Armſtrong of St. Kitt's. In treating the ſeamen put under his care at the Iſland above mentioned, who laboured under the typhous fever, he uſed the cold bath in a vaſt number of caſes with evident good effect, and affirms that it removed reſtleſsneſs, anxiety, and irritation of ſtomach, and that the men themſelves were ſo ſenſible of the relief it afforded that they would call for it in the night.

The rules laid down by Dr. Currie for regulating the practice of cold affuſions are, that it may be ſafely uſed where there is no ſenſe of chilline ſs when the heat of the ſurface is ſteadily above what is natural, and when there is no general or profuſe perſpiration.

I have in ſome caſes of private practice applied clothes dipt in cold vinegar and water to the hands and arms with evident relief.

That it is not always ſafe I had a proof in one caſe in the Weſt Indies; having ſeen it prove immediately fatal to a black girl, who bathed in a brook during the eruption of the ſmall pox.

ſenſations. When a perſon, for example, labours under delirium, and is affected with thirſt, the mind is either ſo agitated with other objects, that this ſenſation is overlooked, or, inſtead of producing a craving for drink, it excites ſome other diſagreeable emotion in conſequence of the diſordered ſtate of the *ſenſorium*. This laſt ſeems to be probable from the ceſſation of delirium, which will take place upon any natural want being ſatisfied. I have ſeen a temporary ſtop put to the patient's raving by making him drink, or upon his diſcharging his urine or *fæces*; for he is then unconſcious of thirſt and other natural wants, is therefore ignorant of the means of ſatisfying them; and when he does ſo, he fancies he is about ſomething elſe which is the ſubject of his delirious thoughts. This obſervation leads to a material practical purpoſe; for it follows from it, that unremitting attention ſhould be given to the patient's feelings and all his poſſible wants, as thoſe natural notices and inſtinctive cravings which occur in health are now wanting, in conſequence of the depraved ſtate of ſenſation.

In

In the courſe of this fever a change of ſymptoms generally takes place which demands a different and even an opoſite treatment to that which was proper in the commencement of the diſeaſe. This change conſiſts chiefly in a great diminution of muſcular ſtrength, of the vigour of the circulations, and in the degree of heat. The periods at which theſe take place is very various. Sometimes the fever has this low character from the beginning, in other caſes it never takes place, ſo that a treatment in ſome degree antiphlogiſtic is neceſſary throughout the diſeaſe. And this accounts for the various and oppoſite accounts we have of the treatment, in which both parties may be in the right, and diſcrimination only is wanted. In general, this tranſition takes place about the end of the firſt week, and the principal remedies thereafter are, bliſters, Peruvian bark, opium, and wine.

I have found what Dr. Lind ſays concerning the efficacy of bliſters confirmed by my own experience, epecially in thoſe fevers in which there was great delirium, *coma*, and head-ach; but I have not experience enough to ſay whether they were as uſeful in the

beginning of the diſeaſe in the Weſt Indies as he found them to be in England*.

The men that were brought from the ſhips to the hoſpitals were affected with the diſeaſe in various ſtages; but as we had in general a very inaccurate hiſtory of the ſeveral caſes, the method of treatment upon their firſt admiſſion was pretty nearly the ſame in all; and it conſiſted, in the firſt place, in waſhing their face, hands, feet, and legs, with warm water and vinegar, from which they derived the greateſt comfort, being commonly very dirty. There ought to be a warm bath at every naval hoſpital kept in conſtant readineſs, as is now the practice at the royal hoſpitals in England; for there are ſo few conveniencies on board of a ſhip for preſerving bodily cleanlineſs among the ſick, that the ſurface of the body becomes loaded with filth, ſo that the operation of the warm bath cannot fail to be highly comfortable and ſalutary as the firſt

* It may be remarked as a point of humanity, that the ſcarf ſkin ſhould not be removed from a bliſtered part, as it is a defence from a great deal of extreme and unneceſſary ſuffering, which no artificial application can equally prevent.

firſt ſtep to their cure when brought on ſhore. We had generally very indiſtinct information about the ſtate of their bowels, as well as other circumſtances, on account of their delirium; but it was at any rate uſeful, or at leaſt ſafe, to give them a clyſter. They were enjoined plentiful dilution; and if they were low, ſome wine and water was allowed. In the evening, the anodyne diaphoretic medicine was adminiſtered, and a bliſter applied to ſome part of the body. In conſequence of this method, we ſeldom failed to find the patients better next morning; and it was tried in ſuch numbers, that the efficacy of it was ſufficiently aſcertained. It happened in ſome caſes, that theſe means were omitted, and a compariſon of theſe with the others ſerved to aſcertain the true efficacy of the medicines; the ſtationary or aggravated ſtate of the ſymptoms, when the diſeaſe was thus left to itſelf, ſufficiently proving the propriety of the treatment above deſcribed.

It is an important queſtion to what circumſtances of this fever the Peruvian bark is adapted. An early and indiſcriminate uſe of it is recommended in ſome late publica-

tions, upon the authority of which I tried it without regard to the ſtages or ſymptoms, and without any prejudice either for or againſt the practice; but I found that this powerful remedy was in danger of doing much harm, unleſs great attention was paid to the circumſtances of individual caſes, in order to aſcertain the proper ſeaſons for giving it. The ſymptoms that forbid the uſe of bark are chiefly foul bowels, hard pulſe, ſizy blood, great delirium, dry tongue, a hot and dry ſkin, and inflammatory affections of the viſcera. It was found extremely pernicious in an early ſtage of the diſeaſe previous to evacuations; and the object of practice at this time ſhould be to relieve the habit by means of theſe, in order to produce a general relaxation of the ſecretions, and to render the ſkin cool and ſoft, thereby paving the way for the bark.

It is not neceſſary, however, eſpecially in the advanced ſtages of the diſeaſe in this climate, to wait for an abſolute remiſſion, in order to adminiſter the bark. In a cold or temperate climate, the cautions above mentioned ſhould be ſtrictly attended to; but in a hot climate it is ſometimes admiſſible

admiſſible where there are ſymptoms of general debility, ſuch as a ſmall pulſe and muſcular weakneſs, though there ſhould be frequency of pulſe, delirium, or even a dry ſkin and tongue. The ſymptom which forbids the uſe of bark more abſolutely than any other, is an inflammatory or dyſenteric ſtate of the bowels, in which caſes it ſeems to be invariably pernicious.

Where it happens that we are extremely anxious to throw in the bark, as we uſually are in the Weſt Indies, where fevers are very rapid and dangerous, and yet the ſymptoms ſeem hardly to admit its uſe, it was very commonly tried either in conjunction with ſome antimonial medicine or neutral ſalt, or theſe were given alternately with it, in order to ſoften and qualify its effects by preventing it from heating or otherwiſe aggravating the ſymptoms. Antimonal wine or *ſpiritus Mindereri* were conveniently employed with this intention.

With regard to the quantity of bark to be given, it may be proper in doubtful caſes of this kind to begin with ſmall doſes, in order to feel how far it agrees or not; but in ge-

neral it may be laid down as a rule with regard to this medicine, that, where it is really proper, and the medicine to be depended on, it is to be given in as large doſes and as frequently as the ſtomach will eaſily bear it.

The next remedy mentioned was opium. It is a medicine more admiſſible and uſeful in this than any other kind of fever; and it is from the good effects I have ſeen from it, in reſtoring and ſupporting the powers of life in this ſpecies of fever, that I have been led to conſider it as one of the firſt cordials in nature. The ſame cautions nearly apply in the adminiſtration of it as have been given with regard to the Peruvian bark, though it is here more generally admiſſible and uſeful. The caution with regard to foul bowels is particularly neceſſary in a hot climate, where an over ſecretion of bile is ſo apt to take place. When the Boreas frigate arrived from England in March 1783, there was a very bad fever of the infectious kind on board, ſome caſes of which being ſent to the hoſpital at St. Lucia, were treated unſucceſsfully with bark and opium, which I had been induced to try upon the authority of the

authors

authors above alluded to. I attributed this want of ſucceſs to the neglect of previous evacuation; for, upon inſpecting the bodies, the inteſtines were found full of bilious *feces*. I profited from this, and was more ſucceſsful in the other caſes. It were to be wiſhed that phyſicians could oftener bring themſelves to confeſs their errors in practice, and their writings would be more inſtructive; for it is of conſequence to know what we are to avoid as well as what we are to follow.

It has been mentioned that very good effects ariſe from the conjunction of an antimonial with an opiate; but, in this ſort of fever, antimonials, and even moſt of the neutral ſalts, are hurtful after the firſt ſtage, and opiates may after this be given alone, or combined with camphor. With regard to the preciſe period of leaving off antimonials, it muſt be left to diſcretion, and the conſtitution of the patient is the beſt guide. There is ſo great a difference in patients in this reſpect, that all practical precepts ſhould be qualified by a due diſcrimination of conſtitutions. In thoſe diſeaſes in which there is a ſpecific remedy, ſuch as the venereal

diſeaſe and the ſea ſcurvy, little room is left for diſcrimination, but in thoſe diſeaſes of which the cure conſiſts in a duly regulated treatment, abſolute and dogmatical rules are ſo far from applying, that there are ſome caſes of the ſame diſeaſe that require a treatment even oppoſite to what is in general moſt adviſeable. This may be very aptly illuſtrated by the ſmall pox, of which there are caſes that ought to be treated very differently from the general method laid down by Sydenham, and in which vinous and aromatic cordials, as well as thoſe of an opiate kind, are highly proper and neceſſary, both in the eruptive and ſecondary fever. And in the ſhip fever ſuch is alſo the diverſity of conſtitution, that I find in the medical journals of the Navy, which it is my official duty to examine, that the antiphlogiſtic treatment has ſometimes proved ſucceſsful when employed through the whole courſe of the diſeaſe. This diverſity of the ſame diſeaſe in different individuals, ſeems to be one great cauſe of the difference of opinion among phyſicians on practical points; each party finding ſome countenance in experience for their general doctrine, do not make allowance for the varieties that exiſt in nature. If the patient is not very much ſunk, and if there

there are bilious ſymptoms, or an obſtinate dryneſs in the ſkin, a few grains of James's powder may be given with advantage even in an advanced period of the diſeaſe. If a hot and dry ſkin ſhould at this period be the only troubleſome ſymptom, it will be more ſafely and effectually removed by camphor combined with ſomething opiate and the *ſpiritus Mindereri*, which is the only neutral now admiſſible, than by antimonials, which at this time, would be in danger either of ruffling the patient by their operation on his ſtomach and bowels, or of weakening him too much either in this way, or by exciting profuſe ſweats. The ſame objection does not lie to contrayerva, which ſeems well adapted to this ſtage of the fever.

Evacuant medicines of every kind being then improper, clyſters are the laxatives chiefly to be employed in caſe the ſtate of the bowels require them. It is to be remarked, however, that the duodenum and ſmall inteſtines are ſometimes loaded with *feces*, though the natural evacuations may ſeem ſufficiently copious, being ſupplied chiefly by the ſecretions of the great inteſtines. As the fever, and particularly the delirium is kept up by retained feces, it is of the utmoſt importance

to

to guard againſt this, and it may be diſcovered by the external feeling of fulneſs and tenſion. Where this is the caſe a laxative by the mouth is adviſable.

But in this advanced ſtage of the fever, in which the moſt common ſymptoms are weakneſs, reſtleſſneſs, tremors, and low delirium, no medicine was found ſo much to be truſted to as opium, which here acts as a cordial as well as an anodyne and antiſpaſmodic. It may be given, in the camphorated julep, in the form of tincture, from five to ten drops every ſix or eight hours, or ſome of the officinal compounds, ſuch as the theriaca or mithridate, may be employed with advantage. There is a variety of caſes in which opium diſagrees when given by itſelf, but with all the good effects expected from this medicine, when conjoined with aromatics, I have thought alſo, that, at this period, caſtor conjoined with opium ſeemed to improve its virtue. This was firſt ſuggeſted to me by Mr. Crudie, an ingenious German ſurgeon, whom I employed as an aſſiſtant at the hoſpital at St. Lucia; and ſince I have been phyſician to St. Thomas's hoſpital, I have found the moſt pleaſing effects, in ſimilar caſes,

caſes, from a compoſition uſed there, the principal ingredients of which are opium and caſtor. In other caſes as well as low fevers, an opiate thus combined would procure ſleep and eaſe, when other forms of it do not ſucceed, and would even produce diſturbance. Opium, particularly in this form, ſeldom fails to raiſe a languid pulſe, and makes it ſlower if it ſhould be very quick. It ſeems to ſtimulate and invigorate the heart to perform more compleat and ſtronger contractions; and it is probably from its effect in making the pulſe fuller, that it has been ſaid by the old theoriſts to rarify the blood.

As the management of opium conſtitutes a conſiderable proportion of the whole art of phyſic; as the beſt things are moſt liable to abuſe; as it is a medicine very powerful and precarious, with great diverſity and even contrariety in its operation; and being the moſt capricious of any with regard to individual conſtitutions, it is of the utmoſt conſequence to fix, if poſſible, ſome rules and principles with regard to the adminiſtration of it; and I hope it will not be conſidered as out of place here,

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to recapitulate and illuſtrate ſtill farther what has been ſaid on this ſubject.

The moſt remarkable ſenſible operation of opium on the ſyſtem, is to increaſe heat and invigorate the circulation, particularly in the brain. When a doſe of it is taken ſufficient to deſtroy life, there is ſo ſtrong a pulſation of the carotid arteries, as to be viſible to the ſight of a bye-ſtander at ſome diſtance. I have myſelf been a witneſs to this. A deficiency in the generation of heat, therefore, and a languor of the circulation, are ſome of the beſt criterions whereby to diſtinguiſh thoſe caſes and conſtitutions to which it is adapted; and the oppoſite circumſtances beſt characterize thoſe caſes and conſtitutions in which it is prejudicial. There is a ſufficient illuſtration of the firſt part of this poſition in the treatment of the fever in queſtion, in which it proves one of the moſt excellent cordial and reſtorative medicines; and it is, I believe, conformable to the obſervation of every experienced practitioner, that wherever there is increaſed heat, or increaſed tone or action of the heart and arteries, or a tendency

tendency to theſe; in ſhort wherever there is ſizy blood or plethora, opiates are hurtful.

In caſes where opiates are indicated by pain and reſtleſſneſs, but when they ſeem forbidden by ſome degree of heat and arterial action, they are modified and corrected, as has been already mentioned, by combining them with ſaline medicines of the neutral kind, or with ipecacuanha or antimony.

There are other circumſtances where opiates require correctives of a different and oppoſite kind, not only in this fever, but in their general employment. There are certain individuals whoſe conſtitutions cannot be reconciled to pure opium, though labouring under ſuch morbid ſymptoms as are moſt commonly relieved by this medicine. In theſe, it either does not produce ſleep, or ſleep of a diſturbed and unrefreſhing kind, and followed by head-ach, nauſea, want of appetite and depreſſed ſpirits, and confuſion of ideas. Theſe inconveniences are frequently obviated by combining it with aromatic ſubſtances, and in this caſe a final-

a ſmaller doſe alſo anſwers the intended purpoſe. The celebrated * officinal compounds

* There is but one of theſe retained in the preſent edition of the London Pharmacopœia, namely, that commonly known by the name of *philonium*, under the title of *confectio opiata*. This ſeems exceptionable, from the too great heat and acrimony of the ſpices it contains; and thoſe that have been omitted, are exceptionable from the unneceſſary multiplication of ingredients, and the too ſmall proportion of opium, which renders the adminiſtration of them inconvenient in point of bulk. I am in the uſe of ordering, in private practice, a ſimilar medicine with the milder aromatics, and I have found it anſwer all the abovementioned purpoſes, by meliorating the operation of opium. The aromatics I commonly order are, equal quantities of carraway, coriander, and cardamom ſeeds, cinnamon, nutmegs, and ſtorax. Theſe are compounded in the form of a confection, ſo as to conſtitute a fourth part of the whole, and with as much opium as to make one thirtieth of the whole. The ſtrength of the ſpices may be adapted to the particular caſe under treatment. If coldneſs, or the want of vigour in the circulation, ſhould render it neceſſary, it may be given with ſome powder or tincture of ginger, or even capſicum.

I have found the aromatic confection joined with laudanum a good ſubſtitute for theſe preparations; and this combination is improved by caſtor either in powder or tincture.

There are other circumſtances to be attended to in the adminiſtration of opium, which are minute and perhaps unaccountable, but nevertheleſs fully aſcertained by experience. It is found, for inſtance, that the preparation of it

pounds containing this drug, owe their virtue and character to this combination; for they are found in innumerable inſtances to afford the utmoſt relief, when it would be hurtful in its pure ſtate. It is not to be wondered, therefore, that they have maintained their reputation for ages. The effect of ſpices in modifying the operation of opiates, probably depends on that reciprocal influence of the brain and ſtomach ſo obſervable in other inſtances. A certain correſpondent ſtate of each ſeems neceſſary to the healthy functions of both, and of the whole ſyſtem. But I avoid reaſoning on this, as we are indebted for this fact, as well as moſt other valuable diſcoveries in practice, to pure experience, and not to phyſiological or pathological deduction.

But in the advanced ſtate, and in the worſt forms of this diſeaſe, wine is an indiſpenſable cordial. This may be given either pure, or diluted with water for common

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it in wine, according to the old form of liquid laudanum, will anſwer in many caſes much better than the tincture of it in ſpirits, according to the preſent form of it in the London Pharmacopœia; and the watery infuſion of it, will in ſome caſes anſwer better than either.

common drink, and ſometimes to the quantity of a quart in twenty-four hours. The quantity may be regulated, by giving ſmall quantities at ſmall intervals, and obſerving from time to time, the effect upon the patient's heat, and the frequency of the pulſe. In delicate people, ſuch as we meet with in private practice, the quantity ought to be leſs, unleſs when the languor, coldneſs, and proſtration of ſtrength are very great, in which caſe, not only wine in large quantities, but ardent ſpirits and cordial confections may be uſed in conſiderable doſes. I have ſeen caſes in which this practice has been remarkably ſucceſsful; but they are very rare, and much diſcretion is neceſſary in diſtinguiſhing them from ordinary caſes.

In the moſt dangerous ſtages of this diſeaſe, when there is inceſſant delirium, unconſcious diſcharge of urine and *feces*, and when nothing can be given by the mouth, either from the reſiſtance or the inability of the patient to ſwallow, medicines and nouriſhment may with great advantage be adminiſtered by glyſter. Bark and other medicines may be given in this manner, and opium,

opium, while it concurs with theſe in its medical virtue, ſerves at the ſame time to make them be retained. A caſe is related by Mr. Reilly of the Beaulieu frigate, of a man recovering under theſe circumſtances, by introducing wine and opium in this manner*.

There is this caution neceſſary with regard to the uſe of wine, that when the fever is gone off, and only extreme debility remains, the free uſe of it is not ſafe nor proper; for, in a weak and exhauſted ſtate, a perſon is more apt to be † heated and intoxicated.

* When there is an inability to ſwallow, either from weakneſs, delirium, or organic impediment, life may be ſupported for a great length of time by this method of introducing nouriſhment. I had an inſtance in my own family of life being not only preſerved in this manner, but final recovery effected, when nothing had been ſwallowed for eleven days.

† Great nicety is required in moſt caſes with regard to the times and doſes of cordials; for it by no means follows that theſe ſhould always be in proportion to the lowneſs and loſs of ſtrength. This is well illuſtrated by Mr. Hunter in his Lectures, where he explains the diſtinction between the *powers* of the body and its *actions*.

toxicated by any fermented liquor, than in health, or even in the preternatural and diſturbed ſtate of actual diſeaſe, ſuch as occurs in

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There muſt be a certain degree of ſtrength to bear the excitement occaſioned by ſtimulating and ſtrengthening medicines or diet; for nothing is more pernicious, or even fatal, than that any part or function ſhould make exertions beyond its ſtrength; and there is the more danger in ill-timed remedies of this kind, as a ſtate of weakneſs is generally a ſtate of irritability.

I have found theories ſo unſatisfactory and fallacious, that I have not ventured to build any thing practical upon ſo ſlippery a foundation; and have therefore excluded them entirely from my text. But though they are in many inſtances pernicious, they are ſometimes uſeful by ſuggeſting remedies, and modyifying and varying methods of cure which might not otherwiſe have been thought of, and which experience may afterwards juſtify. Mr. Hunter does not ſay in what theſe powers of life conſiſt; but there are two principles in the animal œconomy to which theoriſts do not ſeem to have ſufficiently attended. The one is, the power of generating heat, and maintaining a uniform temperature; the other is, that of reſiſting putrefaction; for the natural warmth and moiſture of the living body are exactly what are moſt favourable to the putrefactive decompoſition. If ever theoretical doctrines ſhould attain ſufficient perfection to admit of ſolid practical application, the firſt ſtep in it, I apprehend, would be to enumerate all the powers and functions peculiar to life; for it is preſumable,

in this fever. In the advanced ſtages of this diſeaſe, ſerpentary may be uſed with advantage either alone and in ſubſtance, or conjoined in decoction with bark. Vola-

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able, that to each of theſe there will be a correſponding ſtate of diſeaſe, or deviation from health. Now the reality of the powers I have mentioned cannot be queſtioned, nor can it be denied that they are ſome of the moſt important, nay, eſſential and conſtituent characters of life; and it may be rationally preſumed, that ſome of the moſt frequent and dangerous morbid conditions of the body will conſiſt in a diſorder of theſe powers. Does not obſervation concur with this reaſoning, in declaring, that in fevers which conſtitute ſo great a proportion of the whole of diſeaſes, and have ſo great a ſhare in the mortality of the human ſpecies, derive their principal phenomena and their fatality from an exceſs or defect of theſe two principles? Are not rigors owing to a defect of the generating power of heat; and is not the increaſed heat from which fevers, in all languages, derive their name, owing to an over exertion of the ſame power, which thereby wears itſelf out, and expends life; and is not the cold and torpid ſtate ſo common in the advanced ſtage of the fever now treated of, owing to a want of action in this power; and do not theſe oppoſite ſtates conſtitute the two caſes alluded to by Mr. Hunter? The ſame reaſoning will apply to what may be called the antiſeptic power of life, with this difference, that its deviation ſeems to be only on the ſide of defect. This is moſt remarkable in the malignant fevers of hot climates, as will be ſeen in the deſcription of the yellow fever.

tile ſalts may very properly be employed in the like circumſtances. The objection made to theſe ſalts in this ſort of fever, that they diſſolve the blood, ſeems founded on a ſanciful theory.

After the diſeaſe is removed, a long ſtate of weakneſs is apt to ſucceed, eſpecially in a warm climate. The moſt proper remedies, then, are bitters, ſuch as decoctions of Peruvian bark, infuſions of quaſſia, gentian, or columbo root. Theſe anſwer better than the bark in ſubſtance, which is now apt to nauſeate and load the ſtomach, and the patient is apt to take an averſion to this and whatever elſe he may have taken in a ſtate of ſickneſs. The beſt ſtrengthening medicines are ſuch as comfort the ſtomach and create appetite; and we may mention Huxham's tincture of bark, in ſmall doſes, and a moderate uſe of wine, as the moſt proper for theſe purpoſes. Where colliquative ſweats take place, the vitriolic acid is ſerviceable, and with this intention I have joined it, with evident advantage, to the evening anodyne, which, without ſuch a corrector, tends rather to aggravate this ſymptom. As it is neceſſary to procure ſleep as well as appetite, in order to recruit

cruit ſtrength, the prudent uſe of opiates at bedtime, may be conſidered as one of the moſt effectual cordial and ſtrengthening medicines in this convaleſcent ſtate, eſpecially if combined with volatile ſpirits or aromatics.

It ſometimes happens that heat, and a quickneſs of pulſe, remain in the convaleſcent ſtate without any viſible cauſe. This ſometimes proceeds from *ſordes* lodged in the bowels, and the beſt remedy in this caſe is a cathartic containing calomel. I have ſometimes been ſo confident of this being the caſe, that when the firſt, or even the ſecond or third doſe has failed to produce the intended effect, I have continued to repeat it, till a quantity of *ſcybala*, bile, or ſlime being brought away, the ſymptoms above deſcribed diſappeared.

But in general the management of the ſick at this time, depends as much on diet as medicine. Nothing has been ſaid concerning this in the acute ſtate of fever, becauſe little nouriſhment is then neceſſary. In that ſtate there is a loathing of all food, and the powers of digeſtion and aſſimilation ſeem to be ſuſpended, ſo that alimentary

ſubſtances, unleſs ſparingly adminiſtered, become not only an uſeleſs load, but offenſive and hurtful, by turning acid or putrid. It is likewiſe evident from fact, as well as reaſon, that nature, in this ſituation, requires but little ſuſtenance; for we frequently ſee people labouring under fevers who do well and recover, though they have been without nouriſhment for a length of time, in which the like abſtinence in a ſtate of health would have proved fatal. The friends and attendants of the ſick, from a prejudice not unnatural, but not conſidering the difference between health and that ſtate of derangement which takes place in fever, are for ever wiſhing to ſupply the patient with nouriſhment, and every phyſician meets with trouble in counteracting this officiouſneſs. Nevertheleſs, when the fever draws out to a conſiderable length, and the principal ſymptom is that ſtate of weakneſs which, in low fevers, runs inſenſibly into that of convaleſcence, then it is neceſſary to pay the utmoſt attention to nouriſhment, and nothing tends more to inſure and haſten recovery than the aſſiduous adminiſtration of light and nouriſhing food, the ſame cautions being obſerved which have juſt

juſt been mentioned with regard to cordials. One of the greateſt hardſhips of a ſea life is the want of thoſe articles of diet that are ſuitable to a recovering ſtate, and many lives are loſt from this circumſtance, after the force of the diſeaſe has been ſubdued *.

With regard to the peculiar form, before deſcribed †, which this fever aſſumes a few months after ſhips have been in a hot climate, we found camphor, volatile ſalts, and ſerpentary, the beſt remedies. As there was a remarkable coldneſs of the ſkin, I was induced in one caſe to try the hot bath, and with good effect, from which it ſeems probable that a ſhort ſtay in a bath, of a heat from 96° to 100°, ſo as to have its warming and ſtimulating without its relaxing effects, would anſwer well in fevers of this kind.

* See a method propoſed for obviating this, page 280.
† Page 351 et ſeq.

2. Of the BILIOUS REMITTING FEVER.

THIS is peculiar to tropical climates, and ariſes in the ſame ſituations in which intermitting fevers ariſe in temperate and cold climates. It ſeldom ariſes at ſea, unleſs where there has been previous expoſure on ſhore, of which ſome examples have been mentioned in the firſt part of this work. It may generally be traced to the air of woods or marſhes; and in our fleet hardly any men were attacked with it but thoſe who were employed in the duties of wooding and watering.

The moſt diſtinguiſhing ſymptom is a copious ſecretion of bile which attends it. Its courſe, in general, is ſhorter than that of the fever before deſcribed; and though the ſymptoms are more violent, they are not ſo equal and ſteady, owing to the tendency there is to remiſſion. The ſymptoms are particularly violent at the beginning, in ſo much that ſome of the men, after being expoſed

poſed upon duty to the heat of the ſun and the air of marſhes and woods, would become frantic, being ſeized almoſt inſtantaneouſly with *delirium* reſembling madneſs. This fever, when it ariſes merely from the effluvia of woods and marſhes, has a natural tendency to remit; nay, ſome fevers at St. Lucia, proceeding from this cauſe, were of the pure intermitting form from the beginning. But in many of thoſe that aroſe at Jamaica little or no remiſſion was to be perceived; and it was diſtinguiſhed from the ſhip fever by the bilious vomits and ſtools, more violent delirium, and head-ach, and by being attended with leſs debility. The greater tendency to the continued form at this time was probably owing to this circumſtance, that the men who were expoſed to the land air in wooding and watering, were then expoſed alſo to ſuch cauſes as naturally produce continued fevers, ſuch as infection, the foul air of the French prizes, intemperance, and hard labour. There was in ſome caſes a yellowneſs of the eye, and even of the whole ſkin, but without the other ſymptoms that characteriſe the yellow fever, properly ſo called, while others had every ſymptom of it.

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In cases that proved fatal, the symptoms, for some time before death, resembled very much those of the fever before described at the same stage, There was either *coma* or constant delirium, great seeming anguish, the mouth and tongue very dry, or with only a little ropy slime, a black crust on the teeth, picking of the bed clothes, and involuntary discharges of urine and fœces.

Treatment of the Bilious Remitting Fever.

THE measures proper to be taken in the beginning of all fevers are pretty nearly the same. There is little difference in the first treatment of this from that of the ship fever, except that blood letting is here more frequently proper, and that a more free evacuation of the bowels is necessary on account of the more copious secretion of bile.

In full and athletic habits the disease very commonly begins with pains in the limbs, back, and head, with a strong throbbing pulse; in which case it is proper first of all to let blood at the arm. This is also highly proper

proper and neceſſary in thoſe caſes mentioned above, in which the patient becomes ſuddenly frantic. But though the caſes requiring blood-letting are more frequent in this ſort of fever than that already treated of, yet great caution and nice diſcernment are neceſſary with regard to it, in all caſes, in a hot climate. As fevers in ſuch a climate run their courſe faſter, the ſymptoms ſucceeding each other in a more cloſe and hurried manner, greater expedition, as well as diſcernment, are required in timing the different remedies than what are neceſſary in a cold climate. Blood letting unſeaſonably and injudiciouſly employed either endangers life, or has a very remarkable effect in protracting recovery, by the irrecoverable weakneſs it induces.

With regard to the evacuation by the bowels, it has already been mentioned in another part of the work, when on the ſubject of prevention, that, before the fever comes on, there is a languor and general feeling of indiſpoſition, and that then an emetic and a purgative, followed by ſome doſes of the bark, were the moſt likely means of preventing the attack of the diſeaſe.

eaſe. If the fever has properly begun, which is announced by a *rigor* taking place, then no time is to be loſt in procuring evacuation; and, after blood letting, if the ſymptoms ſhould require it, the beſt medicine is tartar emetic, which, if given in ſmall divided doſes, at ſhort intervals, will moſt probably evacuate the whole inteſtines by vomiting and purging, and may even prove ſudorific. But it will nevertheleſs be proper to adminiſter a purgative medicine ſoon after; and what we found to operate with moſt eaſe, expedition, and effect, was, a ſolution of purging ſalts and manna, either in an infuſion of ſena, or in common water, or barley water, with ſome tincture of ſena added to it.

The next ſtep towards procuring a remiſſion is, to open the pores of the ſkin, which is beſt done by ſmall doſes of James's powder or emetic tartar, aſſiſted by ſaline draughts, which will be given with moſt advantage in the act of effervescence, made either with the fixt or volatile alkali, together with plentiful warm dilution. I once, by way of compariſon, tried the two antimonial preparations above mentioned in a number of men ill of this fever, who were ſent

ſent to the hoſpital at one time, giving emetic tartar to one half, and James's powder to the other, and their effects were ſo ſimilar, that I could perceive no reaſon for preferring the one to the other. Antimonial medicines ſeem better adapted to this than any other ſort of fever, except the rheumatick, and may be more freely given in it.

Theſe are the moſt likely means of bringing about a remiſſion; and if this is effected, nothing remains to be done but to throw in as much Peruvian bark as the ſtomach will bear.

But whether from a freſh accumulation of bile, or ſome other circumſtance, it may happen that the fever is kept up; and in this caſe there is commonly a ſenſe of weight or uneaſineſs about the *hypochondria*, which ſeems to indicate that the redundant bile is in the gall bladder or ducts of the liver. In this caſe a repetition of evacuants is neceſſary, and calomel will be found to anſwer remarkably well as a purgative, its ſtimulus being ſo extenſive as to looſen and bring away bile when the ſaline purgatives, ſuch

ſuch as that above mentioned, had failed of having that effect. I have known theſe to paſs through the inteſtines without relieving the uneaſy ſenſation about the ſtomach, as calomel is found to do; and it will be ſtill more effectual for this purpoſe, if given alone in a doſe, from five to ten grains, and followed ſome hours afterwards by ſome other purgative. I was led to entertain a favourable opinion of the effect of calomel in Weſt India fevers, from having given it in large quantities to a flag officer, who was naturally of an obſtinate temper, and doubly ſo when under the influence of delirium, inſomuch that no purgative, and littlemedicine of any kind, could be introduced except calomel, which was conveniently adminiſtred from its ſmall bulk and little taſte. A ſalivation was unintentionally brought on and the patient recovered. Jalap has been found to be an uſeful auxiliary to calomel; and it is probable that the influence of purgatives of this kind is not confined to the inteſtines, and other abdominal viſcera, but that they excite abſorption of the redundant ſerum, effuſed bile, and other acrid or depraved humours, through the whole body, and

and eliminate them by the inteſtines as the hydragogue purges do in dropſy.

After ſufficient purging, antimonial medicines are again to be had recourſe to; and theſe, as well as purgative and neutral medicines, are ſafe and uſeful in a more advanced ſtage of this fever than they are in the ſhip fever; for the ſtrength is not ſo apt to ſink, and the ſtate of the bowels requires them more. Antimonials, however, are to be uſed ſparingly and cautiouſly as the fever advances; for I have known them, when given only a few days after the firſt attack, to have the effect, in ſome conſtitutions, of making the ſtomach ſwell, and of producing a general ſenſe of heat and uneaſineſs.

After the evacuation of the bowels, the anodyne diaphoretic may be very ſeaſonably given in the manner formerly mentioned; for it will not only tend to ſooth and procure ſleep after the commotion that has been excited, but by its gentle ſudorific effect will aſſiſt in completing the remiſſion.

The principal point of management in the fevers of this climate is, to throw in the Peruvian bark in proper ſeaſon. I formerly

merly took occaſion to differ in opinion from thoſe who alledge that little or no diſcrimination is neceſſary with regard to the circumſtances in which bark is proper in continued fevers. I made fair and unprejudiced trials of this, but always found that ſome ſort of remiſſion, eſpecially towards the beginning of the diſeaſe, was neceſſary, in order to make the uſe of this medicine ſafe and proper. The greateſt vigilance is indeed required that the adminiſtration of it be not omitted when it is at all adviſeable, as the courſe of fevers is very quick and critical in this climate. I have watched many nights with ſome friends in whoſe health I was particularly intereſted, to catch the hour when it might be allowable to give it; and where the propriety of it was ſomewhat ambiguous, it was uſual to qualify it either by conjoining ſome antimonial or neutral ſalt with the firſt doſes, or by giving them alternately with it, as has been formerly mentioned.

Under the uſe of theſe means, the favourable ſymptoms are, a warm moiſt ſkin, a ſtrong ſteady pulſe, with the pulſations under a hundred in a minute, a natural countenance

tenance, and being free from delirium. But if the fever ſhould not yield during the firſt week, but takes an unfavourable turn, the pulſe then becomes more ſmall and frequent, there is a general agitation, the tongue is tremulous when put out, there is great thirſt and delirium, with a dry and hot ſkin. In theſe circumſtances, beſides the continuation of the antimonials in ſmaller doſes, with the anodyne diaphoretic, and the occaſional uſe of purgatives, bliſters become proper; and we found alſo camphor combined with nitre an excellent medicine at this period of the diſeaſe.

Should the patient ſurvive to the end of the ſecond week, the treatment then comes to reſemble more and more that of the infectious fever already deſcribed. Bark may be given, though there ſhould be no proper remiſſion, and cordials and opiates may be more freely uſed. Attention to the ſtate of the bowels will ſtill be neceſſary, ſince repeated accumulations of bile are apt to occur even in the moſt advanced ſtage, and gentle emetics of ipecacuanha, as well as laxatives, may be neceſſary. For the ſame reaſon alſo, greater caution is requiſite in the

uſe of pure opiates than in the infectious ſhip fever before treated of. In order to keep the bowels ſoluble, it was a very uſual practice, and found very uſeful, to conjoin a few grains of rhubarb with each doſe of the bark.

3. Description of the Yellow Fever.

THE fever laſt treated of may be ſaid to be peculiar to a hot climate; but the hot ſeaſons of temperate climates produce ſomething reſembling it. That now to be deſcribed never originates, ſo far as I know, except under the influence of tropical heats. It has indeed been known to prevail, chiefly during the months of Auguſt and September, in the towns of North America, particularly at * Charleſtown in South

* The ſame fever broke out in Philadelphia in 1762, again in 1793, and this preſent year 1798, at the ſeaſon mentioned above. It has alſo viſited New York in 1795, and in the preſent year, but with leſs malignancy than at Philadelphia. It has alſo ſhewn itſelf this autumn, though in a ſtill leſs degree, at Boſton, and in the towns ſtill further north on the coaſt of New England, where it

South Carolina, where, according to the account of Dr. Lining, who has given an accurate * deſcription of it, it prevailed four times in the courſe of twenty-eight years. But he is clearly of opinion that it aroſe from infection imported from the Weſt Indies; and this opinion he builds upon grounds which ſeem unexceptionable.

It differs from the remittent fever with regard to its cauſes, as well as ſymptoms, for though it may ariſe in the ſame circumſtances, the air of woods and marſhes is not neceſſary for its production. All the facts relating to the origin of this diſeaſe, as related in the firſt part of this work, being laid together, and fully conſidered, it appears that it may ariſe among new arrived Europeans, from fatigue in the ſun or intemperance; but that the moſt uſual cauſe

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it had been till now unknown. It has been confined to the ſea-port towns of that continent; and for this, as well as other reaſons, it ſeems to have owed its origin there to infection imported from the Weſt Indies.

* See the Phyſical and Literary Eſſays of Edinburgh, vol. II.

of its becoming epidemic is the influence of the * infection of the ſhip fever, or the putrid exhalations, ſuch as thoſe from the holds of the French prizes †, and that being ſo produced it continues itſelf by infection.

This complaint is ſo peculiar to ſtrangers, that the French call it *fievre de matelot*, and I converſed with ſome profeſſional men in the Weſt Indies, whoſe practice lay among the natives and negroes at a diſtance from ſea-port towns, who informed me they had never ſeen it.

It has been ſaid that it never attacks either the female ſex or blacks. This is

* See pages 129. 147. and 350. This obſervation concerning what may be called the typhous infection, has been fully confirmed this war, 1798; for it has been remarked that the troops who made their paſſage in tranſports which were ſickly and ill aired, were the moſt liable to the yellow fever after they diſembarked, though they might be then in good health. This might be either in conſequence of ſome infection adhering to their clothes, or from ſome obſcure change brought about by its influence on their conſtitution, prediſpoſing them to be affected by the climate.

† See pages 88 and 113.

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in general, though not abſolutely true, for I knew a black woman who acted as nurſe to ſome men ill of this diſeaſe, at the hoſpital at Barbadoes, who died with every ſymptom of it.

There is ſome variety in the forms of this fever, according to the peculiar conſtitutions of different perſons, and other circumſtances; but in the following deſcription, the appearances which moſt frequently occur will be enumerated.

In general it begins with ſhort alternate chills and fluſhes of heat, ſeldom with thoſe rigors which conſtitute the regular cold fit, and with which moſt other fevers begin; theſe are immediately ſucceeded by violent headach, pain in the back, univerſal debility, ſickneſs, and great anguiſh, proceeding chiefly from great pain and diſtreſs at the ſtomach. There is commonly at the beginning a redundance of bile, which is thrown off by vomiting, either natural, or excited by an emetic. Thoſe men who were taken ill with this fever in the Alcide, in the end of the year 1781, had a ſore

throat in the beginning; but this was not a common ſymptom.

In the courſe of this diſeaſe there is not much bile in the inteſtines, and leaſt of all in thoſe caſes that are moſt violent, and prove the ſooneſt fatal. In thoſe whom I inſpected after death, there was but little bile even in the gall bladder. Whether this is owing to a ſcanty ſecretion or an exceſs of abſorption, I will not pretend to determine, but I ſhould rather think it owing to the latter cauſe. In caſes that are more protracted and leſs deſperate, there are frequent accumulations of it, as appears by the vomits and ſtools.

In a few hours a yellow colour is perceived in the face, ſoon after in the eye, and it extends more or leſs over the whole ſkin. This is a ſymptom ſo ſtriking and conſtant, that it gives name to the diſeaſe. Some inſtances occurred in which this ſymptom was contagious, without being attended with the other characters which diſtinguiſh this diſeaſe. It was obſerved in men belonging to the

the * Royal Oak, without any ſymptom of malignity, though evidently infectious; and at the hoſpital it was known to ſpread from men affected with the fever in its worſt form, to others in the adjoining beds, without being accompanied with any malignant ſymptom.

But though the yellowneſs is almoſt a conſtant ſymptom, there is another which characterizes it equally, and may be conſidered equally as a diagnoſtic of this diſeaſe. This is the ſenſe of burning heat at the ſtomach, which is in proportion to its violence and danger, and becomes unſpeakable torture, as the unhappy ſufferers expreſs it. The propriety of fixing upon this as a diſtinctive character of the diſeaſe, is confirmed by the inſpection of the dead body, where the ſtomach is almoſt always † found in ſome ſtage of inflammation, from a ſlight ſuffuſion of its inner ſurface to a ſtate of gangrene. If it were not for the

* See page 148.

† The only exception I find to this in authors, is an eſſay of Dr. Hume, who ſays, that in ſome ſubjects no inflammation of the ſtomach was found, and yet in theſe caſes there was exceſſive vomiting.

great pain of the ſtomach, and the extreme tenderneſs to the touch externally, the appearance found upon diſſection might be conſidered as a mere ſuffuſion from the general *error loci* of the red globules. That it is a real inflammation, and induced by a poiſon, ſeems further confirmed by a paſſage in Brown's Gazette, publiſhed at Philadelphia, where the ſtate of the ſtomach* is

* This affection of the ſtomach ſeems to be, with regard to this fever, what the ſore throat is with regard to the ſcarlet fever; and may not the local inflammation in the one caſe as well as the other, be owing to the peculiar action of a morbid poiſon on the part? It has already been remarked (page 270) that theſe poiſons prove a ſpecific ſtimulus to the reſpective organs which they affect. The greater part of thoſe in a volatile form affect the lungs, or different parts of the paſſages to them; but thoſe which are the cauſes of fevers intermittent and continued, are probably ſwallowed with the ſaliva, and affect the ſtomach either by exciting an immediate diſeaſe in it, as in this caſe, or by diſturbing the ſyſtem in general by ſympathy, as in the intermittent. There is a ſimilar ſpecific action in the morbid poiſon of dyſentery; and I have lately ſeen in manuſcript, an account of an epidemic inflammation of the colon, in the Eaſt Indies a few years ago, proceeding moſt probably from a like cauſe.

That principle of the animal œconomy whereby the ſeveral organs are ſpecifically acted upon by their native fluids, by morbid poiſons, and medicines, ſeems to offer a wide field for medical reaſoning.

deſcribed

deſcribed as ſimilar to that which is induced by acrid poiſons, ſuch as arſenic.

There is ſomething very peculiar in the countenances of thoſe who are ſeized with this diſeaſe, diſcernible from the beginning by thoſe who are accuſtomed to ſee it. This appearance conſiſts in a yellow or dingy fluſhing or fulneſs of the face and neck, particularly about the parotid glands, where the yellow colour of the ſkin is commonly firſt perceived. There is alſo in the eye, and muſcles of the countenance, a remarkable expreſſion of dejection and diſtreſs.

One of the moſt conſtant and diſtreſſing ſymptoms of this fever is an obſtinate unremitting and painful *pervigilium*, which is the more agonizing, as the patient is extremely deſirous of ſleep. It is ſeldom that even a *delirium* comes to his relief to make him forget himſelf for a moment; but he continues broad awake, night and day, with his reaſon and ſenſes ſound, and in a ſtate of the moſt uneaſy agitation.

But

But in all the ſtages of this diſeaſe, it is the affection of the ſtomach that affords the moſt diſtinguiſhing and important ſymptoms. As it advances, an unconquerable irritability of this organ comes on. Whatever is ſwallowed, whether ſolid or fluid, of whatever quantity or quality, is immediately rejected by vomiting. An almoſt inceſſant retching takes place, even without any extraneous irritation, which commonly on the third day ends in what is called the *black vomit*, the moſt hopeleſs of all the ſymptoms attending it, and the fatal termination of it is commonly on this day.

Bleeding at the noſe is a frequent ſymptom in the more advanced ſtages; and ſome authors relate that blood alſo eſcapes ſometimes from the pores of the ſkin, which I never ſaw, but can readily believe. The red globules ſeem to enter the colourleſs order of veſſels every where. It is farther in proof of this, that when any part of the ſkin is ever ſo little preſſed upon, a damaſk red colour remains for ſome time, the ſmaller veſſels readily admitting the red gobules. This happens more probably from a relaxation

tion of the veſſels, than from a diſſolved ſtate of the blood. From the ſame cauſe it is apt to eſcape from the veſſels, particularly from the ſurface of the alimentary canal, and the membrane of the noſe. I have ſeen death in more than one caſe brought on ſuddenly by a profuſe bleeding from the inteſtines; and this has probably in moſt caſes more or leſs ſhare in the fatal iſſue. The black matter that is vomited, and the black colour of the *feces* and urine, in the laſt and hopleſs ſtate of this diſeaſe, ſeem to be owing to this propenſity to hæmorrhage in the internal ſurfaces.

The yellow colour of the ſkin ſeems to be more owing to this *error loci* of the globular part of the blood, than to the over abſorption of bile. This colour does not appear firſt in the eye, as in the jaundice. It may indeed be produced in this manner in the ſkin, without any ſuſpicion of the preſence of bile. This is exemplified in the caſe of chlorotic women, and other caſes of chronic weakneſs. We have alſo a proof of it in the *ecchymoſis*, which follows upon an external contuſion. In this caſe the red part of the blood is mechanically forced either

either into the ſmaller order of veſſels, or into the cellular membrane, which occaſions firſt a livid appearance, and in the courſe of the recovery the ſame parts become yellow, probably in conſequence of the greater part of it being removed by abſorption or otherwiſe; for Sir Iſaac Newton obſerves, that blood reduced to thin *laminæ* aſſumes a yellow colour *.

With regard to the ſkin, it is at the firſt extremely hot and dry, but the external heat ſoon becomes very little different from the ſtandard of health, and the ſkin feels ſoft and moiſt. There ſometimes happens an eruption of ſmall puſtules, with white heads, on the trunk of the body, which is a favourable ſign; and I have ſeen a head-ach diſappear upon this breaking out.

* Optic. B. 1. Part 2. Prop. 10. It is obſerved by Dr. Ruſh, that in ſome ſubjects the yellow colour did not come on till a few minutes after death; which ſeems favourable to the opinion of its ariſing from ſomething in the maſs of blood, and not from bile. And as the yellow colour firſt ſhews itſelf about the neck, and ſometimes in broad ſpots on the trunk of the body, it is hardly conceivable that ſuch partial affections can be owing to an effuſion of bile, which would neceſſarily act equally and generally.

The

The pulſe is hard and frequent at the beginning, but after the hurry of the firſt attack it becomes very moderate in point of ſtrength and frequency, ſo as to prove no index of danger. It is then from eighty to a hundred pulſations in a minute, and regular. A moderate ſtate of the pulſe is uſual in inflammation of the ſtomach or bowels from whatever cauſe it may proceed.

In the advanced ſtage of the diſeaſe, the head-ach and delirium alſo abate. I have ſeen caſes in which the ſenſes were not affected from beginning to end; and I never obſerved that violent and inceſſant delirium which uſually attend the dangerous ſtate of other fevers. It is in this reſpect, and in the ſtate of the ſkin and pulſe, in which it chiefly differs from the fever laſt deſcribed.

The ſtate of the *fauces* is alſo different from that of moſt other fevers, for there is commonly no exceſſive thirſt. The tongue is ſomewhat white and foul, but I do not remember to have ſeen it black and dry.

A want

A want of action in the bowels, and an inſenſibility to purgative medicines, are common ſymptoms, and indicate great danger. One of the moſt unfavourable ſymptoms is when the *feces* are like white clay, as I have ſeen in ſome caſes that run out to the length of a week before they proved fatal. A bilious diarhœa ſpontaneouſly coming on, is a very favourable ſymptom.

In unpromiſing caſes the urine is ſcanty, and in the laſt ſtage of life it becomes of a very dark colour, as was mentioned before. A plentiful ſecretion of urine is a very favourable circumſtance, and ſeems to be one of nature's methods of curing the diſeaſe; and ſuch caſes are obſerved to terminate well. I remember one caſe in particular, in which ſeveral quarts were diſcharged daily for ſeveral days together, and it was of a very dark ſaffron colour, but looked green where the ſurface was in contact with the ſide of the pot. I inſpiſſated a ſmall quantity of it, and found a large reſiduum, which was very deliqueſcent, and ſeemed to be all ſaline. In a hot climate the urine

does not ſhew that ſeparation and depoſition which denote the criſis of fevers in cold climates, and this is perhaps owing to there being leſs mucilage and more alkali in the former, on account of the more putreſcent ſtate of the fluids. Upon adding a little vinegar to the urine in the caſe above mentioned, it became turbid like the critical urine of the fevers of Europe.

At the approach of death, cold clammy ſweats come on; the pulſe continues regular and of a certain degree of ſtrength, but grows gradually ſlower. I have counted it at forty pulſations in a minute. The patient is frequently ſenſible to the laſt moment; nor does the countenance always ſink into what is called the *Hippocratic* appearance. In other caſes I have ſeen, at this time, *coma*, and not unfrequently convulſions. Broad livid ſpots ſometimes alſo appear on the ſkin. Extreme muſcular debility, a great difficulty of deglutition, and a dimneſs of the eye-ſight, are likewiſe common ſymptoms in the laſt ſcene. The ſtriking difference between the ſymptoms at the fatal period of this fever, from what they are in other fevers, ſeems to depend on the cauſe

of

of death here conſiſting in a local affection of a vital heat.

The different ſtages which lead to diſſolution following each other thus rapidly, there is not that gradual failure of the powers of nature that uſually give warning of approaching death; but the ſprings of life run down, as it were, at once, the wretched ſufferer expires, and is happily delivered from the moſt extreme miſery of which human nature is ſuſceptible.

Such is the general train of ſymptoms in this fever, as they occured to my obſervation; but great varieties occur both in the ſymptoms and duration, ſo great indeed, that it is hardly recogniſable for the ſame diſeaſe *. I ſhall give ſpecimens of ſuch anomalous

* The yellow fever which broke out in the Weſt Indies in the year 1792, ſuppoſed to originate in the iſland of Grenada from contagion imported from the iſland of Boullam on the coaſt of Africa, and which made ſuch deplorable havock in our fleets and armies, during the war which took place the following year, differs in ſome particulars from that which has juſt been deſcribed. The moſt remarkable points of difference were, that the yellow colour was not ſo conſtant; there was an exquiſite pain

malous caſes in two that occurred at Port Royal on board of the Canada, in July, 1782.

A lieutenant

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pain of the eyes, which were ſaid, as it were, to ſwim in blood. A dilatation of the pupils was alſo a common ſymptom, and a more ſevere affection of the head in general in point of delirium, *coma*, and head-ach. Water was found in the brain upon inſpection. *Dr. Chiſholm's Eſſay on the Malignant Fever*, and *Journals of Navy Surgeons*. The ſame difference with regard to the affections of the head, was obſervable in this fever as it has lately ſhown itſelf in North America. This fever differs alſo from that of the Weſt Indies, both as I have deſcribed it, and as it has lately appeared, in proving fatal at a later period. The caſes of greateſt violence and danger proved fatal in the Weſt Indies, on the third or fourth day, but in America, on the fifth or ſixth. Two caſes of morbid diſſection made at Boſton, in New England, in the beginning of September 1798, have juſt come to my hand, and as they throw ſome intereſting light on the nature of this diſeaſe as diverſified by climate, I ſhall here mention the outlines of them. The ſubject of the firſt died on the ſixth day from ſeizure, and as no medical means were employed till the firſt ſtage of the illneſs was nearly over, the appearances may be conſidered as the natural effects of the diſeaſe. Not only the ſtomach itſelf was found greatly inflamed, but all the inteſtines more or leſs ſo, as well as the liver: alſo the peritonæum on the lower ſurface of the diaphragm, and the pleura in its upper ſurface. The air veſſels of the lungs were full of blood, and ſeveral ounces of firmly

A lieutenant of that ſhip had been ſubject, for four days, to fits of retching, without any bilious diſcharge or pain in the ſtomach; and, except a white tongue, he had no ſymptom of fever in that time, nor any thing to prevent him from doing his duty.

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coagulated blood were found in the cavity of the thorax. There were no marks of ſuppuration any where, nor any putrid fœtor, nor any unuſual tendency to putrefaction in the body. The gall ducts were found impervious, and yet the black vomit had preceded death; which ſeems to prove, that the ſtomach itſelf is the ſource of the black matter. I ſuſpect, that the black matter found by ſome authors in the gall bladder, is alſo effuſed blood, a general tendency to hæmorrhage in all the internal ſurfaces, being one of the moſt remarkable characters of this fever. The other ſubject died on the twelfth day. There were here evident veſtiges of inflammation in the brain, lungs, and liver. The ſtomach was nearly in its natural ſtate, except that the villous coat was covered with a black matter, though there had been no black vomiting. The duodenum and the other ſmall inteſtines were inflamed, as was the inner ſurface of the urinary bladder, which was very much contracted, and had thrown out blood into its cavity. The inflammatory affection in both theſe caſes is more prominent than in the Weſt Indies. Though this is moſt probably owing to the climate being more northerly, yet it affords an additional proof of its general inflammatory nature, and a preſumption in favour of early and copious blood-letting.

On

On the fourth day, when I firſt ſaw him, he began to complain of a fixed pain in the pit of his ſtomach, which was not very violent, and about the ſame time a yellowneſs began to appear on the white of the eye. He took a laxative medicine, which had the deſired effect, and ſome volatile ſpirits, with ſome drops of thebaic tincture in ſimple mint water, for the pain in his ſtomach. He had a good night. Next day the complaint of the ſtomach was better; but there was great muſcular debility. He had ſeveral natural ſtools; and as there ſeemed little indication but debility, he took nothing that day except an infuſion of ſome bitters and aromatics in wine. As he did not want for appetite, he eat ſome broth and chicken; and nothing to give any alarm happening this day, except a ſhort qualm, in which he was faint, with a ſenſe of cold, feeling to himſelf, as he ſaid, as if he ſhould have expired. In the afternoon he began to have black-coloured ſtools, which was the firſt ſymptom that clearly betrayed the nature of the diſeaſe. He was then ordered as much Peruvian bark as he could take with red wine, and theſe his ſtomach bore. Decoction of bark was alſo given

him in clyſters. He had a ſtrong voice, and was quite ſenſible, but grew weaker and weaker with frequent returns of the qualms, and he expired that evening before ten o'clock. The copious black ſtools betrayed an internal hemorrhage, which probably had the principal ſhare in his ſudden diſſolution.

I have not the leaſt heſitation in ranking this caſe with the fevers laſt deſcribed, though ſo many of the uſual ſymptoms were wanting. This gentleman, though of a lively, active diſpoſition, was of a ſlender make, and of a dingy, doughy complexion.

The ſudden fatality of this caſe, and the peculiar mode of it, ſeemed to be owing to natural debility, and the propenſity to internal hemorrhage, to which the threatenings of ſyncope, and at laſt the fatal event, ſeemed more immediately to be owing.

A few days after this gentleman's death, another officer of the ſame ſhip was taken ill with the ſame ſort of fever, and it was alſo attended

attended with ſeveral unuſual ſymptoms. Neither his ſkin nor eyes were yellow; the ſkin was hot and dry throughout the diſeaſe, and during the three firſt days there was a diarrhœa, which was neither bilious, putrid, nor mucous, but conſiſted in watery ſtools. There were no gripes, nor any local pains whatever; but I never remember to have ſeen more ſuffering from that general anguiſh, particularly about the ſtomach, which attends this ſort of fever. On the third night he began to vomit and purge blood, which ſoon terminated in that dark-coloured diſcharge which is a ſymptom ſo characteriſtic and fatal in this diſeaſe. He continued ſenſible till within eight hours of his death, which happened on the fourth night. The pulſe was full and pretty ſtrong during the whole courſe of the diſeaſe; but there was all along great debility and frequent ſighing, ſymptoms that ought always to create alarm.

I have but one other circumſtance to mention regarding an individual. I attended a marine officer at St. Euſtatius in 1781, who had the yellow fever in its moſt violent form. Upon my entering his apart-

ment one day in the latter ſtage of it, he fell into convuſions, which laſted, with little interruption, for ſome hours. I found they came on and went off with an eclipſe of the ſun: but whether this ſymptom had any connexion with this phenomenon; or if it was merely a fortuitous coincidence, I am unable to determine. I never had any other reaſon to ſuſpect that this diſeaſe was affected by celeſtial influence.

Treatment of the Yellow Fever.

I FEEL this as the moſt painful and diſcouraging part of this work, the yellow fever being one of the moſt fatal diſeaſes to which the human body is ſubject, and one in which human art is the moſt unavailing.

It ſeems hardly to admit of a doubt that there are particular inſtances of diſeaſe, in their own nature, *determinedly fatal*, that is, in which the animal functions are from the beginning ſo deranged, that there are no poſſible means in nature capable of controlling

ling that ſeries of morbid motions which lead to diſſolution. Of this kind appear to be the greateſt number of caſes of the plague, many of the malignant ſmall-pox, and ſome of fevers, particularly of that kind now under conſideration. It is extremely difficult to aſcertain ſuch caſes from obſervation; and it may be ſaid that the opinion of the exiſtence of them is favourable to ignorance and indolence. But, on the other hand, it may be queſtioned if more harm is not likely to ariſe in medicine by being too ſanguine and officious, than by a diffidence of art and truſting to the powers of unaſſiſted nature. Were we thoroughly acquainted with the animal œconomy, we ſhould perceive *a priori* in what inſtances the ſeeds of diſeaſe would either operate ſo as neceſſarily to terminate in death, or when they were within the command of art. But we can derive little or no information from this ſource, on account of our great ignorance of the ſecret operations of the living body; ſo that the only grounds of judging are our obſervation and experience concerning the uſual event of diſeaſe, and the effects of remedies. Though theſe are circumſtances attended with great uncertainty and ambi-

guity, yet I believe it will be admitted as the opinion of the moſt chaſte and experienced obſervers, that there do really exiſt diſeaſes whoſe courſe cannot be diverted by any means that can be employed. This opinion, I have ſaid, is, in one view, extremely diſcouraging; yet, to the mind of a feeling and conſcientious practitioner, who muſt often find his beſt endeavours baffled in many diſeaſes as well as this, and who might be apt to look back and accuſe himſelf of ſome fault or omiſſion, it affords this ſatisfaction to his reflections, that the want of ſucceſs may have been owing to ſomething in the nature of the diſeaſe, and not to his want of ſkill and attention. But though the fatality of this diſeaſe is diſcouraging, let us not deſpond, but rather redouble our diligence in obſerving what aſſiſtance and relief nature may admit of.

In delivering the treatment of this diſeaſe, I ſhall conſider it as my duty not only to give an account of my own practice, but of ſuch remedies and methods, as have been recommended and brought into uſe, ſince the laſt edition of this work.

It

It is proper in this, as in every other fever of this climate, to begin the cure by cleanſing the firſt paſſages. This does not produce the ſame relief here, as in the common remittent fever, becauſe there is a leſs quantity of bile preſent in the inteſtines, and therefore leſs oppreſſion from the collection of it. I commonly employed the purging ſalts for this purpoſe, but moſt of the later practitioners are agreed that calomel may be employed with ſuperior advantage in this ſtage of the diſeaſe. With this intention it is given from ten to fifteen grains. Ten grains of it with as much jalap was a medicine employed with uncommon ſucceſs in the malignant fever of Philadelphia according to the teſtimony of Dr. Ruſh.

Glyſters of purging ſalts and caſtor oil have been found very uſeful in cleanſing the bowels, more eſpecially when purgatives by the mouth, have been obſtinately rejected.

As the ſymptoms of this diſeaſe, are very violent, and its progreſs very rapid, and as the ſucceſs of the means to be employed, will depend on the earlineſs of the adminiſtration,

no

no time is to be loſt in applying the moſt efficacious remedies. It is preſumable that no remedies but ſuch as produce ſome powerful effect, and a thorough change in the morbid condition of the body at an early period of the diſeaſe, can be of real avail in ſaving life. Though therefore purgative medicines have been firſt mentioned, it is not neceſſary to wait for their operation before employing other means of cure. This remark applies particularly to blood-letting; the ſucceſs which depends peculiarly on the earlineſs of its adminiſtration. There is generally a * buff on the blood in the beginning of the diſeaſe, but in its ſecond ſtage, it is mentioned by a † French author, that it

* There is a difference in the appearance of the blood when ſizy, perhaps not ſufficiently inſiſted on by practical writers; for though there ſhould even be a very thick buff, yet, if the ſurface is flat, and the craſſamentum tender, no great inflammation is indicated, in compariſon of that ſtate of the blood wherein the ſurface is cupped, the craſſamentum contracted ſo as to afford the appearance of a large portion of ſerum, and where it feels firm and tenacious, though perhaps but thinly covered with buff. This is a diſtinction well worth attending to in practice; for it is in theſe laſt circumſtances that blood-letting gives moſt relief, and where the patient will bear the repetition of it with moſt advantage.

† Monſieur Deſportes who wrote a treatiſe on the diſeaſes of St. Domingo.

hardly

hardly coagulates or ſeparates. This indicates the propriety of confining this remedy to the firſt period, and perhaps this ſhould not much exceed twelve hours. It is further preſumable, from reaſon, that this evacuation is well adapted to this fever, from the moſt important affection being an inflammation of a vital part. But as this inflammation has a tendency to gangrene, and as extreme debility rapidly comes on, it is evident that blood-letting ought to be practiſed with diſcrimination, and limitation. The great and laudable anxiety about the means of combating this dreadful enemy, has, among other new and bold methods of cure, led to the practice of very copious and repeated veneſection. Nor is it to be wondered that the ſanguine expectations of practitioners, in ſcenes ſo embarraſſing and affecting, where the emotions of the mind are too ſtrong for the cool exerciſe of judgement, ſhould have led them to over-rate the ſucceſs of certain favourite methods of cure, and to carry them to an inordinate length. It is only in this way, and partly from the difference of individual conſtitutions, that the great diverſity and even contrariety of the reports of medical men concerning

cerning this and other remedies, can be accounted for, as it is hardly conceivable that there could be in any one a deliberate intention of deceiving.

The ſubjects to whom blood-letting is moſt likely to be beneficial, are thoſe of a robuſt and plethoric conſtitution newly arrived from Europe. As my practice lay chiefly among ſeamen, accuſtomed to the climate, and living chiefly on ſalt proviſions, I had little opportunity of ſeeing the effects of this method of cure. I am ſtill of opinion, that in the majority of caſes occurring among ſeamen, it will not be adviſable, and that it will ſeldom be proper beyond the firſt twelve hours. The teſtimonies in favour of its being performed copiouſly and repeatedly in the * army in the Weſt Indies, and among the inhabitants of † Philadelphia, are ſo ſtrong as to afford ſatisfactory evidence

* See Treatiſe on the fevers of Jamaica, by Robert Jackſon, M. D. London, 1791, and an Enquiry into the nature and cauſes of the great mortality among the troops at St. Domingo, by Hector Maclean, M. D. London, 1797.

† See an Account of the bilious remitting yellow fever, as it appeared in the city of Philadelphia, in the year 1793, by Benjamin Ruſh, M. D.

of

of its utility in many caſes. In the opinion of Dr. Clarke of Dominica *, who has written one of the moſt judicious and temperate treatiſes on this diſeaſe, and according to the report of ſome of the ſurgeons of the navy of the beſt ſenſe and underſtanding, this evacuation requires great reſtriction, and diſcrimination, with regard to the caſes to which it is applicable, and the extent to which it ought to be carried †.

* See a Treatiſe on the yellow fever, as it appeared in the Iſland of Dominica, in the years 1793—4—5—6.

† Conſidering that the principal danger of this diſeaſe, conſiſts in a local inflammation, it is rather ſurpriſing that local blood-letting ſhould not have occurred to myſelf or others as a likely means of relief. It is one of the advantages of local bleeding, that the ſame effect may be produced at leſs expence of blood, and it muſt be of conſequence to ſave blood in the preſent inſtance, from what has been ſaid above of gangrene and debility. Leeches are not to be procured in the Weſt Indies, but it would ſurely be worth the trial to take away blood from the ſtomach, externally by cupping in the very early part of the diſeaſe, at which time only blood-letting can be of ſervice, and before the part becomes too tender for the application of the inſtruments. I beg leave to recommend the trial of this, to thoſe who may ſee this work, and to whom this diſeaſe is likely to occur.

It is remarked by an intelligent navy ſurgeon, that bloodletting is not without its uſe, though it may not ſave life, for he alledges that it alleviates the ſufferings attendant on death.

The

The next of thoſe remedies, which have of late been brought into uſe, to which I ſhall here advert, is mercury employed not as a purge, but to bring on a ſalivation as quickly as poſſible. This is done either by giving calomel in doſes of two or three grains every hour, or five grains every three or four hours, conjoined with half a grain of opium, or a few grains of philonium, to prevent its running off by the bowels, or by introducing large quantities of ointment by the ſkin, ſo as to bring on ſalivation as ſpeedily as poſſible. I find one inſtance in the journal of a navy ſurgeon, in which calomel was given with ſucceſs in doſes of fifteen grains every two hours, till a hundred and fifty grains were given. Half a grain of opium was given with every doſe except the firſt. The * teſtimonies in favour of this are alſo ſo ſtrong, that its utility in many caſes ſeems eſtabliſhed on ſolid grounds, but the ſame allowance is to be made, as in the former inſtance, for the overrated ſtatements of its ſanguine advocates. Its character, however, as a remedy generally applicable and uſeful in this diſeaſe, is

* See Eſſay on the malignant peſtilential fever introduced into the Weſt Indies from Boullam in 1792, by C. Chiſholm, M. D. and Journals of navy ſurgeons.

much

much better eſtabliſhed than that of blood-letting.

The only other powerful remedy I know of, which has been lately boaſted of in this diſeaſe, is cold-bathing. It has been confidently recommended by ſome * practitioners of high character in the army in St. Domingo; but the teſtimonies in its favour, are by no means uniform, either in the Weſt Indies, or North America. According to the account of Dr. Ruſh, the moſt full and candid trials were made of it in Philadelphia, both by medical practitioners and others, but with a degree of diſappointment which made it be generally abandoned. But as it is an error to imagine that any one mode of practice is adviſeable in all caſes without exception, ſo is it unwiſe to preſume that there may not be remedies applicable to many particular caſes, though not univerſally and indiſcriminately admiſſable. When the ſkin is very hot and dry, the daſhing of cold ſea-water on the patient the firſt day of attack, may

* See the works of Dr. Jackſon, and Dr. Maclean, above referred to.

prove

prove a moſt powerful and uſeful remedy. The medical gentlemen of the navy, do not ſpeak ſo favourably of this practice as thoſe of the army, probably becauſe the ſymptoms of re-action, as they are called, are not ſo ſtrong among ſeamen as ſoldiers, for the reaſon mentioned above, and ſome of them own that they had reaſon to repent it, from the coldneſs and depreſſion, almoſt irrecoverable, and even the fatal event which enſued in ſome caſes. There is however a mitigated method of putting it in practice, in favour of which there are many teſtimonies. This conſiſts in the external application of clothes ſoaked in cold water, or vinegar and water. It is alleged, that this was the means of recovery in ſome caſes apparently deſperate. Under this head may be reckoned cold gliſters, conſiſting either of plain water or decoction of bark*.

It

* There is ſtill another new remedy, the mention of which ought not to be omitted.

The extract or eſſence of ſpruce, which is made and employed for the purpoſe of preparing ſpruce beer (a fermented liquor made from melaſſes) acquired for a ſhort time a high character for the cure of the yellow fever, in conſequence of the pretended accidental diſcovery of the maſter of a merchant ſhip, and this character was far-

It ſeems an objection to the cold bath, that it is hardly compatible with the practice by ſalivating with mercury. An eminent navy ſurgeon reports, that under this courſe of medicine, he found benefit from the warm bath. Another reports, that he uſed it ſucceſsfully in caſes where ſpaſms came on. The warm bath is alſo a likely means of producing a ſoft ſkin and a free perſpiration, which is an eſſential point when the ſtomach is to be ſoothed, for it is ſagaciouſly obſerved by Sydenham, that the ſtomach being commonly very irri-

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ther confirmed, by its being introduced into one of the ſhips of war at a time when the fever was ſpontaneouſly ſubſiding, as is generally the caſe with every epidemic after prevailing for a certain term. In the ſtate of deſpair and deep affliction which then prevailed, every twig was caught at; and a very extenſive trial of this medicine was made by order of government; and though it by no means anſwered to its firſt reputation, it was not found to be an inſignificant remedy. It acted as a bitter cordial to the ſtomach, which ſometimes retained it when every thing elſe was rejected; and being a terebinthinate medicine, it acted alſo as a diuretic. This is a very ſalutary mode of operation, as will be ſeen hereafter. The method of adminiſtering it, as directed by the firſt propoſer, was to diſſolve three ounces of the eſſence in a quart of hot water, and to take half a pint of it every two hours.

table in the plague, the moſt effectual means of making it retain what was adminiſtered internally was to excite a ſweat.

The next powerful medicine I ſhall mention is Peruvian bark. The great irritability of the ſtomach comes on ſo early in the diſeaſe, that neither this nor any other medicines can be given by the mouth. Nor is it adviſable to urge it in thoſe caſes, and in that period of the diſeaſe in which blood-letting is proper. But as a great many caſes in this climate do not admit of free evacuation in any ſtage, and as I apprehend there is a certain point in moſt febrile diſeaſes at which the inflammatory diſpoſition ceaſes, the adminiſtration of this medicine becomes of the utmoſt importance. Beſides, the inflammation here ſeems of the eryſipelatous kind, and this requires the free adminiſtration of bark, even in its moſt acute ſtate. The nature of the inflammation in this fever is farther illuſtrated, by its being obſerved, that ſuppuration is never found to have taken place in the inflamed parts.

In

In caſe the bark ſhould be rejected by the ſtomach, in common with every thing elſe, it may be given in glyſter. I even cauſed it to be applied in decoction, externally, to the ſkin, with ſeeming advantage. Though it is not a medicine relied on in the late practice, it ſeems conformable to reaſon as well as experience, that where it can be employed, it is likely to be well ſuited to a diſeaſe verging rapidly ſometimes to gangrene, and always to extreme debility.

However impracticable or exceptionable the uſe of the bark may be in thoſe caſes which prove fatal in three or four days, in conſequence of inflammation of the ſtomach, the ſame objection does not lie to thoſe caſes which are more protracted, and the termination of which reſembles more that of other fevers.

The ſoothing of the ſtomach is an eſſential point of treatment, not only to enable it to bear medicine and nouriſhment, but with a view to allay general irritation and anguiſh.

The firſt medicine that naturally preſents itſelf to our attention for this purpoſe, is opium. But there is no point in which practitioners are more agreed than in the inefficacy of it in this caſe; ſo that the only uſe made of it by the beſt practitioners in the early part of the diſeaſe, is to prevent calomel from purging when it is given with a view to ſalivate, or to make the bark be retained when it is given in glyſter.

The juice of the fruits of the climate, particularly of lemons and oranges, has been highly extolled as a ſoother of the ſtomach. I did not find it anſwer its character in this reſpect; and it happened not uncommonly, that acids of every kind were loathed extremely, ſo as to produce nauſea, and aggravate the vomiting. Where the pure acid was rejected, I have found that a compoſition of it with wine, hot water, nutmeg, and ſugar, was very grateful to the palate and ſtomach. For common drink it ſometimes happens, that the ſick perſon prefers the decoction of farinaceous ſubſtances to any other liquid; and in one caſe in particular, which did well, the patient was led by taſte to prefer warm water gruel to every other

other drink or nouriſhment; and the large quantity he took ſeemed to have a conſiderable ſhare in his recovery, by keeping up a warm moiſt ſkin, and producing a great flow of urine.

The ſaline draught in the act of effervescence has been employed to check vomiting with evident advantage. But in moſt caſes, this ſymptom is ſo obſtinate, as to diſcourage all attempts to remove it. I have known magneſia and mint water have a viſible effect in ſoothing the ſtomach, particularly when given after ſome acid beverage. Some practitioners in the Weſt Indies, in the late war, found benefit from the infuſion of chamomile flowers in checking vomiting; and a ſurgeon in the navy, in his journal, highly recommends, from his own experience, a weak infuſion of quaſſia for the ſame purpoſe. The French author beforementioned affirms, that milk boiled with ſome flour or bread, given in the quantity of a ſpoonful at a time, and frequently repeated, had more effect than any thing he had tried in ſtopping the vomiting in this fever. I have lately heard of a practitioner in one of the iſlands, who adminiſtered pure milk with

the ſame intention, and with remarkable ſucceſs. It was ſtrongly affirmed to me by a credible perſon, that the ſame practitioner, in a caſe in which this ſymptom was at its greateſt height, and in its worſt form, ſo as to be conſidered as beyond relief, gave a drachm of calomel at one doſe, whereby the vomiting was removed, and the life of the patient ſaved; the black matter, which had begun to ſhew itſelf, ſeeming to be carried off by ſtool. One inſtance is not ſufficient to eſtabliſh a practice, but as theſe are caſes in which bold experiment ſeems juſtifiable, this deſerves a farther trial.

I have ſeen vomiting relieved, by fomenting the ſtomach with ſtupes wrung from a decoction of bark, and ſprinkled with camphorated ſpirits and tincture of bark.

But in enumerating the means of relieving the ſufferings of the ſtomach, I have, laſtly, to mention, what I conſider as the moſt efficacious of any, namely, a bliſter to the part. In ſo far as I know, I was the firſt who uſed and recommended this remedy; and it was ſuggeſted to me, by obſerving, in examining dead bodies, that the

ſtomach

ſtomach was the principal ſeat of morbid affection. I am glad to find the ſame practice recommended by Dr. Clarke of Dominica, and Dr. Maclean, who practiſed in the army in St. Domingo during the three firſt years of the preſent war. A ſurgeon of the navy who followed this practice with ſucceſs, found that all the good effects were obtained from it without actual veſication, and therefore removed the plaſter after it had produced inflammation, avoiding thereby the great ſuffering and tedious ulcers, ſo frequently the conſequence of a raw ſtate of the ſkin in this climate.

A practitioner of reputation has recommended alum and white vitriol for ſtopping the internal hemorrhage, ſo incident to this diſeaſe. This has not had a trial ſufficiently extenſive to eſtabliſh its utility; reaſon ſeems to be in its favour, and therefore merits imitation.

I have no other internal remedy to recommend. Whatever power of retention there may be, more eſpecially if the patient ſhould ſurvive that ſtage of the diſeaſe in which the inflammation of the ſtomach

proves fatal, ſhould be employed in taking the bark. In the more protracted ſtages, camphor alſo will be found of ſervice; and if given in the evening with an opiate, perſpiration and ſleep will probably be procured, by which the patient will be greatly relieved.

Bliſters to the thighs and legs at this time, ſeemed alſo to coincide with the general intention of cure, and they appeared to be of advantage in the caſes in which they were tried *.

* As I could not, without embarraſſing the narrative in the text, acknowledge my obligations to the ſeveral ſurgeons of the navy, of whoſe obſervations I have availed myſelf in this article, I think it due to the great judgment, fidelity, and induſtry, with which they diſcharged the important duties of their ſtation, here to ſay, that I am chiefly indebted to Mr. Robert Chriſtie, of the Prince of Wales; Mr. Thomas Robertſon, of the Iphigenia; Mr. Alexander Aberdoun, of the Sheerneſs; Mr. John Malone, of the Ganges; Mr. Robert Harris, of the Thunderer; Mr. George Sibbald, of the Canada; Mr. Thomas Kein, of the Queen; Mr. John Buchanan, of the Brunſwick; Mr. Thomas Stuart, of the Vanguard; Mr. Alexander Anderſon, of the Sampſon; Dr. William Pattiſon, of the Leviathan; Mr. John Crawford, of the Succeſs; Mr. Thomas Downey, of the Dædalus; Mr. Francis Wye, of the Rattler; Mr. Robert Williams, of the Cormorant; Mr. Daniel Campbell, of the Eurus; and Mr. — Bonieux, of the Beaver.

4. Of Intermittent Fevers.

IT ſometimes happens, particularly in the Weſt Indies, that intermittent fevers are ſo obſtinate as to reſiſt the common means of cure by the Peruvian bark; ſo that theſe complaints become extremely diſtreſſing to the medical practitioner as well as to the patient. Indeed this was a difficulty that occurred ſo often, that I was ſometimes tempted to think, either that the great reputation of this medicine is not ſo well founded as is commonly believed, or that the bark generally in uſe in theſe times is not of ſo good a quality as that employed by the phyſicians who firſt eſtabliſhed its character.

But, in the firſt place, the experience upon which its reputation was firſt built was in a temperate climate, where very few agues are found to reſiſt it when properly adminiſtered. In the next place, there is reaſon to believe that, in fact, the medicine itſelf now commonly in uſe is not equally powerful with what was firſt employed;

ployed; and a ſpecies of it, called the Red Peruvian Bark, has lately been diſcovered, or rather, perhaps, revived, which is certainly of a ſuperior quality, and has been found to cure intermittents, in which the common ſort had failed *.

I was informed by Dr. Hendy, of Barbadoes, that he had found the flowers of zinc to anſwer in caſes of intermittent fever, in which even the bark and every other remedy and mode of treatment had failed. It was found very ſucceſsful in the like caſes, both in my own trials at the hoſpitals, and by the ſurgeons of the men of war to whom I recommended the uſe of it. At the hoſpital at St. Lucia, in the months of February and March 1783, three intermittents, out of five which had reſiſted the bark, were cured by this medicine. The other two were cured by returning to the

* The red bark was brought to England in a Spaniſh prize in the year 1781, and a very accurate account of its medical and chemical properties was publiſhed the year after by Dr. William Saunders, of Guy's hoſpital. None of it had been brought to the Weſt Indies before the peace, ſo that I had no opportunity of trying it in that climate. There is a yellow Peruvian bark now in uſe, which is equal to the common ſort.

uſe

uſe of the bark, and giving it in ardent ſpirits, with a few grains of capſicum or ginger. The zinc anſwers beſt in caſes of long ſtanding, where there is no complication of other diſeaſes, and where the intermiſſions are very diſtant. In ſuch caſes, the paroxyſms of intermittents ſeem frequently to be repeated by a ſort of habit, after the original cauſe of the diſeaſe is removed. The doſe of this medicine is from two to four grains every ſix or eight hours.

The white vitriol, which is a ſalt of zinc, was found by ſome of the ſurgeons of the fleet to anſwer equally well in ſimilar caſes, when given in the doſe of five grains every four hours. I did not try this in the Weſt Indies, but found it to anſwer in St. Thomas's Hoſpital, to which I was elected phyſician a few months after my arrival in England.

Opium is one of the moſt valuable ſubſidiaries to the bark in the cure of intermittent fevers, and the employment of it for this purpoſe is an important improvement in modern practice. It was firſt, I believe, introduced by Dr. Lind, who recommends

it

it to be given in the hot fit in a doſe of twenty-five drops of the tincture. But the method of adminiſtration which has ſince been found moſt convenient and ſucceſsful, and now in common uſe, is to give thirty drops an hour before the expected fit; and the effect will be rendered much more certain if it is given with a ſpirituous or aromatic liquid made hot, the patient being kept warm in bed at the periodical hour. Mr. Macliesh *, a ſurgeon in the army ſerving in Corſica in the years 1795 and 1796, gave opium with ſucceſs in obſtinate intermittents, three hours before the time of the expected attack, beginning with three grains and increaſing it gradually according to the obſtinacy of the caſe. In this manner the doſe was ſometimes raiſed to twelve grains. Much ſmaller doſes will in general be found ſufficient, particularly if conjoined with mulled wine or hot diluted ſpirits.

There is a practice mentioned by † Celſus, which ſeems rational, and deſerving of

* See Medical Annals, Vol. 2d.

† Lib. III. Cap. xii.

imitation,

imitation, in caſes which do not readily yield to ordinary means; it is to put the patient into a warm bath, ſo that he ſhall be there at the period in which the cold fit may be expected to recur.

The late Dr. Huck Saunders informed me, that when he was phyſician to the army at the ſiege of the Havannah, in the year 1762, he cured a number of agues which had reſiſted the bark, by giving two ounces of the vinous tincture of rhubarb and ſix drachms of the tincture of ſenna, ſeven or eight hours before the expected fit. This being repeated two or three times removed the diſeaſe. He informed me alſo, that he had met with agues in England which did not yield to the bark, but upon leaving it off, and putting the patient on a courſe of mercury, they were readily cured upon returning to the uſe of the bark.

Arſenic has alſo been found an effectual remedy in intermittent fevers. I was informed by Dr. Huck Saunders, that when he was in North America, in the war which broke out in 1755, Mr. Ruſſel, a ſurgeon in the army, who had the medical management

ment of an expedition undertaken againſt the Cherokee Indians, having provided himſelf with a great quantity of pills, containing each the eighth part of a grain of this mineral, was enabled to cure the intermittents, to which the troops were very ſubject. It is a medicine occaſionally uſed with ſucceſs in modern practice, but is now commonly given in form of ſolution. Dr. Darwin recommends to give ten drops of a ſaturated ſolution ſeveral times in the day, or a quarter of a grain an hour before the period of the paroxyſm.

Every means of inducing a powerful excitement in the principal functions of the body at the period of attack, ſeems to poſſeſs a power of preventing it. Not only the paſſions of the mind have an influence over it, but the inducing of a change in the circulation by mechanical means. Mr. George Kellie *, an ingenious navy-ſurgeon, has tried with ſucceſs the effect of compreſſing the large arteries by a tourni-

* See obſervations on the medical effects of compreſſion by the tourniquet, by George Kellie, ſurgeon in the royal navy, &c. London, 1797; and Annals of Medicine, vol. 2d.

quet;

quet; and this practice has been imitated by others with the like ſucceſs. The compreſſion is to be made on the great arteries of two of the principal extremities, and continued from ten minutes to a quarter of an hour, immediately before or during the cold fit.

CHAP. II.

Of FLUXES.

THESE ſeem to ariſe in the ſame circumſtances, and to be owing to the ſame general cauſes, as fevers. They may, in ſome ſenſe, be conſidered as fevers, attended with peculiar ſymptoms in conſequence of a determination to the bowels, juſt as fevers in cold climates are ſometimes attended with rheumatiſm and catarrh. We have ſeen, in the firſt part of this work, that the dyſentery aroſe chiefly in thoſe ſhips which had been ſubject to fevers.

This determination to the bowels is owing to a variety of cauſes, but is chiefly connected

connected with external heat; for it is moſt common in hot climates, and towards the end of ſummer or in the autumns of cold climates, owing probably to a greater acrimony of the ſecretions of the inteſtines, and particularly of the bile. Dyſenteries ariſe in camps alſo at the ſame ſeaſons, and in the ſame circumſtances as bilious fevers *.

Beſides climate and ſeaſon, the other circumſtances determining to the one diſeaſe more than the other are, 1. A difference in the conſtitutions of different men; for in the ſame ſhip it ſometimes happens that both diſeaſes prevail equally, though all the men are uſing the ſame diet and breathing the ſame air. 2. The nature of the occaſional cauſe. A dyſentery, for inſtance, is more likely to ariſe from an irregularity in eating or drinking; a fever from being expoſed to the weather, particularly marſh effluvia. 3. The particular ſpecies of infection that may happen to be introduced. Suppoſe, for example, that a ſhip's com-

* Sir John Pringle on the Diſeaſes of the Army.

pany

pany is prediſpoſed to acute diſtempers, and one man or more ill of the dyſentery ſhould be brought on board, this will become the prevailing diſeaſe, as happened in the Torbay in Auguſt 1780. If the like number if fevers ſhould be introduced, then fevers will be the prevailing diſeaſe. 4. Different habits of life. The crew of a tranſport, in a voyage from England to New South Wales, were all ſeized with fevers, while the convicts were ſeized with fluxes.

Theſe two diſeaſes may therefore be conſidered as *vicarious*, the one ſubſtituting itſelf for the other according to particular accidents, and both proceeding from the ſame general cauſes; and this is no new idea of mine, but ſeems to have been Dr. Sydenham's, when he calls the dyſentery a *febris introverſa*. It may be farther added, that dyſentery is the ſafeſt form in which this cauſe, which is common to both, can exert itſelf; for it is a diſeaſe more within the reach of art; and ſome of the moſt dangerous ſymptoms attending fevers ſeldom occur in dyſentery. Among theſe may be reckoned head-achs and *delirium*, one of the moſt frequent cauſes of which, in feveriſh

affections, ſeem to be a ſtagnant or torpid ſtate of the bowels. When dyſentery proves fatal, it is in conſequence of violent local affection, and that in general after it has taken a chronic form. When an incipient fever turns into a dyſentery, all the ſymptoms, and particularly the head-ach, delirium, and *coma*, if there ſhould be any, are immediately relieved. And the moſt favourable caſes of the yellow fever are thoſe in which a bilious diarrhœa comes on, while the moſt fatal are thoſe in which the bowels are ſo torpid as to be inſenſible to any ſtimulus either from their own contents or from medicine.

I ſhall not enter into a minute deſcription of this diſeaſe in all its ſtages, as this has been ſo ably executed by Sir John Pringle, Sir George Baker, and other authors, but ſhall only give a ſketch of ſome of the moſt remarkable ſymptoms, particularly ſuch as are peculiar to the climate and habits of life in the ſervice in which I was engaged, ſo as to explain the varieties that may be neceſſary in the mode of treatment.

The

The fluxes that aroſe in the fleet were either what may be called the acute idiopathic dyſenteries, or a dyſenteric ſtate of the bowels from neglected diarrhœas, which was moſt apt to occur in the convaleſcent ſtate of fevers, or in men labouring under the ſcurvy. The body is more ſuſceptible of infection in a ſtate of weakneſs from theſe or any other cauſes; and in hot climates the dyſentery ſeems to be more infectious than fevers; for at hoſpitals it was ſo frequently communicated to men who were ill of other complaints, that it was in theſe the principal cauſe of mortality. For this reaſon particular attention was paid to the ſeparation of thoſe who were affected by it, from thoſe who were ill of other complaints.

I have met with ſome violent and untractable caſes which proved fatal in the acute ſtate; but, in general, this diſeaſe draws out to a chronic form in this climate, and does not prove mortal for many weeks. The uſual cauſe of death appears, from the inſpection of the bodies, to be an ulceration of the great inteſtines, particularly of the deſcending colon and the rectum. This part

of the inteſtinal tube is moſt affected from its being the receptacle of all the acrid ſecretions from the reſt of the canal; and it is naturally more ſubject to congeſtions of the fluids and incurable ulcers, as appears from the rectum being ſo liable to the hæmorrhoids and the *fiſtula*. This ulceration of the great inteſtines is ſo common, that, out of eight caſes which I inſpected after death, ſeven had this appearance. The caſe in which there was none was not ſo much a caſe of dyſentery as of inflamed bowels, brought on by the man having drank to exceſs of ſpirits while he was recovering from a dyſentery. The ſevere *tormina*, which always occur in the firſt days of the diſeaſe, ſeem owing to an inflammation which terminates in ulcers; and theſe being conſtantly irritated by the ſharp humours, produce the *teneſmus*, which is the ſymptom moſt eſſential to dyſentery in the after part of the diſeaſe. Any diarrhœa may in this manner become dyſenteric. During the acute griping at the beginning, the ſtools are looſe and copious; but as ſoon as the teneſmus takes place, they are ſcanty, which is moſt probably owing to the ſpaſmodic ſtrictures in the great inteſtines, in conſequence

quence of their excoriated ſurface being irritated by acrid fluid. The inflammatory ſtate is more laſting and violent, the gripings are more ſevere, and the danger is alſo greater in this ſtage of it in a cold than a hot climate.

The ſtate which the great inteſtines fall into in old dyſenteries, ſeems to have ſomething in it peculiar to itſelf: the ſeveral coats become thick and ſpongy; their texture is obliterated and deſtroyed; and they become of a black or very dark purple colour. This, however, cannot be called mortification; for the fibres of the gut do not loſe their tenacity, nor is there that putrid and diſſolved ſtate in which gangrene conſiſts; but it advances in time to ſuch an extreme ſtate of diſeaſe, as to be entirely incapable of recovering its natural appearance and functions, and proves therefore the cauſe of death.

The greater frequency and obſtinacy of theſe chronic fluxes in hot than in cold climates, ſeems to be owing to the ſame weakneſs of the powers of life, induced by heat, which make recovery in general ſo tedious,

and particularly that of wounds and ulcers. The greater quantity of acrid bile will alſo tend to keep up the ulceration. Dyſenteries have alſo this diſadvantage, that the Peruvian bark, which is the moſt powerful reſtorative in other complaints of this climate, is here in moſt caſes found to be inadmiſſible on account of the heat, thirſt, and other febrile ſymptoms, which it ſeldom fails to induce in all ſtages of this diſeaſe.

TREATMENT of FLUXES.

THERE are few diſeaſes in which a prudent employment of art is more uſeful, or in which early means of relief are more requiſite than in this*.

Where the dyſentery is the original diſeaſe, and when the patient is robuſt, and

* This is elegantly expreſſed as follows, in Sir George Baker's learned Diſſertation on this diſeaſe:—"Primo "neglectus tractatu aſperior occurrebat; etenim corpus "extenuatum atque confectum ut morbo fervido impar "erat, ita ipſi impar curationi. Itaque optimum erat "occurrere ipſis principiis atque auxilia mature præri-"pere. In hoc enim corporis affectu aliquod certi in "medicina opus eſt, haud multum in naturæ bene-"ficio."

plethoric,

plethoric, with acute pain and a ſtrong pulſe, blood-letting may be practiſed with advantage in the beginning of the complaint. But there is no part of the practice in this diſeaſe, in which the climate and manner of life makes a greater difference than in this; for in a temperate climate it frequently happens that repeated blood-letting is neceſſary; but in a hot climate, where the fibres are relaxed, and in the conſtitutions of ſeamen, whom we ſeldom or never find plethoric, the inflammatory ſymptoms requiring this evacuation do not run ſo high, nor continue ſo long.

It is in all caſes of the utmoſt conſequence to adminiſter as early as poſſible a briſk ſaline purgative. An ounce and a half or two ounces of purging ſalts may be diſſolved in a quart of barley water or water gruel, and given warm in cupfuls, at ſmall intervals, till a free and copious evacuation is produced. If there ſhould be much fever, or ſickneſs at ſtomach, two grains of emetic tartar will be a great improvement of this medicine; and there will be this farther advantage from its uſe, that if the ſtomach ſhould be loaded with bile, in which ſtate

it is more irritable, an evacuation upwards will alſo be excited to the great relief of the patient.

This early and ſeaſonable meaſure will, in many cases, put a ſtop to the diſeaſe, eſpecially if the patient is thrown into a ſweat immediately after the bowels have been thus thoroughly evacuated. It is of great ſervice in this diſeaſe to promote free perſpiration, and even a plentiful ſweat, which may be effected with great advantage by giving, at bed time, a medicine compoſed of opium, ipecacuana, and a little neutral ſalt, accompanying it with plentiful warm dilution. Nothing tends more to relieve griping and teneſmus than a general warm moiſture on the ſkin. The ipecacuana, which is an ingredient in this medicine, is one of the beſt anti-dyſenteric remedies we know; the opium procures reſt; and this, joined to the ſudorific effect of the whole, not only gives a temporary relief, but tends to carry off the diſeaſe. It is moſt properly given in the evening; for there would be this inconvenience in conſtantly encouraging a ſweat, that if the teneſmus ſhould return, it would either be checked by the patient getting

getting frequently out of bed, or there would be danger of his catching cold. I am well aware that we cannot be too cautious with regard to the uſe of opium in the beginning of this diſeaſe; but it is admiſſible more early in a hot climate than a cold one, as the inflammatory ſymptoms are leſs violent and can be ſooner ſubdued; beſides, it becomes an entirely different medicine when conjoined with the other ingredients that have been mentioned.

The beſt medicine in the day time we found to be ſmall doſes of ipecacuana alone twice or thrice a day; and if there ſhould be freſh collections of bile, ſmall doſes of the ſaline purgative will be neceſſary. Ipecacuana, in this intention, may be given in the doſe of two grains in athletic conſtitutions, ſuch as thoſe of ſeamen; but in the more delicate conſtitutions, ſuch as are commonly met with in private practice, one grain is a ſufficient doſe. I have found manna and tamarinds a good addition to this medicine in the earlier ſtages of the diſeaſe, where there was much bile; but in a more advanced ſtage of it they are apt to produce gripings and flatulence.

The

The marks of a redundance of bile are, a ſickneſs at ſtomach, a ſenſe of ſcalding at the anus when the ſtools are paſſing, and the yellow or green colour of the ſtools themſelves. It is apt alſo to excite ſymptoms of fever, ſuch as a foul tongue, a hot and dry ſkin, with thirſt. When collections of it are ſuſpected in this diſeaſe, it is beſt to evacuate it by vomiting, for it is thereby prevented from irritating the bowels, and from arriving at the inflamed parts with, perhaps, increaſed acrimony, acquired in paſſing through the whole length of the inteſtines.

Some gentlemen of the fleet informed me that they found oil of almonds a uſeful addition to the purgative. Others as well as myſelf made a practical compariſon of the ſaline purgative with that compoſed of rhubarb and calomel, as recommended by Sir John Pringle, and we gave the preference to the former, as more eaſy, ſpeedy, and effectual in its operation, eſpecially in the firſt ſtage. Caſes may occur, however, in which the other may be more adviſable; for where there is a ſenſe of weight about the ſtomach, which moſt probably ariſes from

from the biliary organs being clogged with bile, and where emetics have failed to remove it, or the weakneſs of the patient may render them improper, then calomel has the beſt effect: for it was formerly obſerved, that it tends to looſen the ſecretions, and to ſtimulate the more diſtant excretories, ſuch as the biliary ducts.

It is very important to caution young practitioners concerning the employment of opium in all ſtages of this diſeaſe, but eſpecially in the beginning; for though it is an excellent remedy when ſeaſonably and judiciouſly employed, it is very liable to abuſe, particularly in the hands of the inexperienced, who may be tempted to give it improperly from an anxiety to relieve; but as more harm may ariſe from an unſeaſonable adminiſtration of it, than could be compenſated by the beſt-timed uſe of it, it is ſafeſt to err on the ſide of caution and omiſſion. The principal caution to be obſerved with regard to this remedy is, to premiſe ſuitable evacuation, ſuch as bloodletting, if neceſſary, but more eſpecially purging. It is always pernicious to give it in its pure ſtate during the *tormina*, ſo common

mon in the firſt days. By theſe I mean the abdominal gripings, which denote inflammation, and are entirely different from the *teneſmus*, which is a more conſtant and characteriſtic ſymptom of the diſeaſe, and ſeems to ariſe from irritation and ſpaſms of the rectum and colon.

It was in this diſeaſe that I firſt obſerved the good effects of a ſmall quantity of neutral ſalt, in taking off the inconveniencies attending opium, ſuch as the feveriſh heat and confuſion of the head, which it is apt to produce in many conſtitutions; and as the adminiſtration of the anodyne coincided with the evening doſe of ipecacuana, I was led to adopt a form ſimilar to that of Dover's powder, but with only half the quantity of opium; or, it was given in a liquid form, by combining twenty drops of thebaic tincture and a drachm of ipecacuana wine, with nitre from five to ten grains, in any ſimple vehicle in form of a draught. There is a very obſervable difference, in ſome caſes, between opium given in a liquid and in a ſolid form; and the former is much more certain in its effect, when the intention is to procure ſpeedy and effectual eaſe.

I have

I have obſerved great benefit from the uſe of external remedies in dyſentery, and theſe have, perhaps, been too much neglected by authors and practitioners. The warm bath is of great ſervice, eſpecially where the gripes and teneſmus are ſevere, and where the fever has been taken off by previous evacuation. Fomentations or warm applications of any kind to the abdomen give temporary relief; and it will be found of advantage to keep thoſe parts, at all times, well defended from the cold air. Bliſters to the abdomen were alſo found of uſe, and likewiſe acrid liniments, compoſed of oil, volatile ſpirits, and tincture of cantharides. Where the ſtomach has been much affected, I have perceived relief from fomenting it with ſtupes, upon which thebaic tincture and camphorated ſpirits were ſprinkled, as recommended by Dr. Lind. I was once affected with a bad dyſentery in the Weſt Indies, and I thought myſelf much relieved by the warm bath and a bliſter. Strangury is not an uncommon ſymptom in this diſeaſe, independent of cantharides, and the moſt ſenſible and effectual relief is derived from fomentations to the pubes

pubis and perinæum, as I alſo experienced in my own caſe.

I have in private practice found great comfort and relief afforded by a fomentation of the *anus* with hot water or decoction of camomile flowers with ſome laudanum ſprinkled on the ſtupes. This has ſo ſenſible and ſudden an effect in allaying the agonies of teneſmus, that any patient who has once experienced the good effects of it will not fail to call for the repetition of it upon the recurrence of the ſame ſufferings. This operation alſo relieves ſtrangury. The *ſphincter ani* is poſſeſſed of great ſenſibility and ſympathy, ſo that any impreſſions made upon it are readily communicated to the inteſtines and bladder.

What has been hitherto ſaid regards chiefly the acute dyſentery; but the moſt frequent and troubleſome complaint that occurred at the hoſpital, was the ſame diſeaſe in what may be called its chronic ſtate.

There is a conſiderable variety of ſymptoms in all the ſtages of this diſeaſe, but

particularly in the more advanced or chronic ſtate, ſo that a correſponding variety is neceſſary in the modes of treatment, and there are few diſeaſes in which there is more room for diſcrimination.

In all ſtages of it an accurate diſcernment is neceſſary with regard to the uſe of opiates, and great part of the practice here conſiſts in timing theſe well. They are leaſt admiſſible in the beginning, where evacuation is the principal object; but as the diſeaſe advances they become more and more allowable and uſeful. The principal cautions neceſſary in their adminiſtration are, 1. To premiſe ſufficient evacuation, ſo that the inteſtines may not be loaded with bile, *ſcybala*, or any other irritating matter at the time of giving the opiate. 2. To obviate the effects which an anodyne has of cauſing a retention of the contents of the inteſtines. This may be done either by giving ſomething purgative along with it, or after it has produced its quieting effect. The former method ſeems preferable; for as ſoon as the effect of the opiate is over, the purgative is ready to act; and in this way it is ſo far favourable to the operation of the purgative,

gative, that large feculent ſtools will be diſcharged: whereas, had the purgative been given alone, it would have been more apt to produce ſcanty griping ſtools, attended with teneſmus. Rhubarb anſwers well in ſuch caſes, and may be given in a doſe from twelve to twenty grains, according to the age and conſtitution. 3. To prevent feveriſh heat and delirium. This was propoſed to be done in the firſt ſtage of the diſeaſe, by combining it with ipecacuana and a little neutral ſalt. With the ſame intention, it may now be joined with a few grains of Dr. James's powder, or* *vitrum ceratum antimonii*, in which form it would not be ſo ſtrongly ſudorific, an effect not ſo much required in the chronic as in the acute ſtate. A clean tongue, as it denotes the abſence of fever, is one of the ſymptoms that chiefly juſtifies the uſe of opiates.

The principal cauſes that keep up the flux, and render it ſo obſtinate, are, 1. A too great ſecretion of bile, either continual or frequently recurring. 2. Ulcers in the great inteſtines. 3. A lienteric ſtate of the bowels. 4. A retention of *ſcybala*.

* See Medical Eſſays of Edinburgh, vol. v.

The

The firſt cauſe is much leſs frequent than might be expected by thoſe who fancy that every diſeaſe of this climate proceeds from bile. When there does occur a redundancy of bile, there is more occaſion for the employment of evacuant medicines, and more need of caution in that of opiates. A medicine that will diſpoſe the liver, or the circulating ſyſtem in general, to form leſs bile, is a *deſideratum* in phyſic; but in caſe of an exceſſive flow of it, emetics and mercurial purgatives, as has been already mentioned, are the beſt means of evacuating it; and care ſhould be taken that it be diſcharged before it accumulates too much, or becomes acrid by too long retention.

In order to obviate that irritation in which teneſmus conſiſts, great benefit will be found from the injection of emollient and anodyne clyſters, to waſh off and dilute the acrimony, and to ſooth the parts ſo as to allow them to heal. A ſtrong infuſion or decoction of linſeed or ſtarch may firſt be given to the quantity of near a pint, to be evacuated after a ſhort retention, and then a few ounces of the ſame, with thirty or forty

drops of laudanum, to be retained for a time, in order to procure reſt.

I was at firſt tempted to think that a very frequent injection of ſuch clyſters would be very uſeful, by cleanſing and ſoothing the colon and rectum, ſo as to prevent farther exulceration, and diſpoſe the parts to heal. But beſides the objection ariſing from the tenderneſs of the inteſtine, which, in ſome caſes, renders the operation itſelf painful, I found that if they were given oftener than once a day, they rather increaſed the uneaſineſs, and made the patient feel languid and exhauſted; ſo true it is, that no practical rule can be eſtabliſhed from reaſon alone, without being brought to the teſt of experience. The rectum ſeems to have a peculiar ſenſibility, and a remarkable conſent with the whole ſyſtem; for the act of evacuating the rectum will induce ſyncope, or even death, in a ſtate of great debility. Clyſters may be pernicious, even though they produce no evacuation of *feces*; and Sydenham has remarked, with reſpect to other diſeaſes, that their unſeaſonable or too frequent uſe greatly debilitates and diſturbs the patient. When not abuſed, however, they

they are of the moſt eminent ſervice in this and other complaints.

Certain medicines, which have been called *ſheathing*, have been recommended to be taken by the mouth. Of this kind are mucilage, oil, and wax. I have made trial of mucilage, ſuch as ſtarch, without any ſenſible effect, probably becauſe it loſes its qualities by the powers of digeſtion, before it reaches the part upon which it is intended to act. With regard to oil, I have hardly enough of experience of my own to decide; but ſome of the ſurgeons of the fleet informed me, that they found advantage from combining it with the purgatives. I was diſcouraged from uſing it by finding that it was apt, in the Weſt-Indies, to become rancid on the ſtomach, and for this reaſon I ſoon laid aſide the uſe of the caſtor oil, which, though produced in that climate, ſeems to anſwer better as a medicine in Europe. But ſince my return to England I have uſed, with great benefit, at St. Thomas's hoſpital, a medicine, compoſed of tincture of rhubarb and oil, in old dyſenteries, attended with diſcharges of blood. I took the hint of this from finding it of

great ſervice in high-ſeated piles, as recommended by Dr. Griffith*. It is neceſſary to combine ſomething purgative with the oil, otherwiſe it might be altered by digeſtion, or abſorbed, or might become rancid by too long retention in the firſt paſſages. Wax is a body not changeable by digeſtion, and ſeems therefore well ſuited for the purpoſe of ſheathing the bowels; and I have found advantage from the preparation of it recommended by Sir John Pringle†, on the authority of Dr. Huck. I have alſo ſeen ſome advantage in old fluxes, in St. Thomas's hoſpital, from the uſe of ſpermaceti, given with an equal quantity of conſerve of roſes and half as much abſorbent powder, agreeably to a form in uſe at that hoſpital.

The climate has a great influence in pre-

* In Dr. Griffith's form of his medicine for the piles, ſix drachms of freſh-drawn linſeed oil are joined with two drachms and a half of the vinous tincture of rhubarb, and a ſcruple of bole armoniac, and given twice a day in a draught. I commonly uſed oil of almonds at the hoſpital. This may be conſidered as another inſtance of thoſe uſeful combinations of medicines, which experience alone ſometimes diſcovers.

† See Diſeaſes of the Army, p. 273. 6th Edit.

venting

venting theſe ulcers from healing, upon the ſame principle that it prevents the cure of external ſores and wounds, ſo that there are caſes that admit of no cure but from a change of climate. I have ſeen in ſome caſes of old dyſentery, ſmall, round, ill-conditioned ulcers break out on the ſurface of the body, which ſeemed to proceed from the ſame general habit that produced thoſe of the inteſtines. There was ſomething peculiar in the appearance of thoſe external ſores, being like ſmall round pits, as if a part of the ſkin had been removed by cauſtic, and with little or no diſcharge. In a caſe of this kind, which proved fatal, I found the whole ſurface of the great inteſtines beſet with ſmall ulcers, not unlike thoſe on the ſkin.

Since the firſt edition of this work was publiſhed, I have met with a pamphlet, written by Dr. Houlſton, of Liverpool, in which the friction of mercurial ointment on the abdomen is recommended as a cure for old fluxes; and I have tried this practice in ſome very obſtinate caſes in St. Thomas's hoſpital with ſucceſs. In theſe caſes it is probable the diſeaſe is kept up by a

vitiated ſtate of ſome of the various ſecretions belonging to the inteſtinal canal, which the mercurial alterative tends to correct; or perhaps, according to the ingenious theory of Dr. Darwin, the operation of mercury here, as in other caſes, conſiſts in exciting abſorption.

The next cauſe that was mentioned of the long continuation of fluxes, was a lienteric ſtate of the bowels. This conſiſts in a great irritability of the whole alimentary canal, whereby all the *ingeſta* are tranſmitted ſo faſt, that there is no time for aſſimilation. Liquid aliment, ſuch as broth, is particularly ſubject to this inconvenience. There are few caſes of long-protracted fluxes in the Weſt-Indies, without this ſymptom in ſome degree.

The remedies that are here found of moſt ſervice, are ſuch as counteract irritability or relaxation, or promote abſorption. It is in caſes where this is the prevalent ſymptom, that opium may be moſt freely uſed. Frequent and ſmall doſes of the compound officinals, ſuch as theriaca, pulvis e bolo compoſitus, or diaſcordium, have been found

of ſervice. Though the ſtate of weakneſs would ſeem here to indicate the Peruvian bark, yet it is only in ſome few very advanced caſes that it is found of ſervice. But there are other bitters that are found more frequently effectual in reſtoring the tone of the bowels. Of this kind are ſimaruba, quaſſia, camomile flowers, and colombo root. The firſt has been reckoned a ſpecific in this ſort of flux; but though its powers are undeniable, it will be found frequently to fail *. I have alſo uſed, with advantage, an infuſion of gentian and cinnamon in Port wine. Something aromatic has a good effect when added to the bitter, being adapted to prevent or obviate flatulence, which is a common and troubleſome ſymptom in this complaint. A purgative of calomel and rhubarb is adviſeable from time to time in this form of the diſeaſe, and alſo external mercurial friction if it ſhould be obſtinate.

That

* Since coming to England, I have been informed by Dr. Garden, a learned and ingenious practitioner from South Carolina, that this medicine, in order to produce its proper effect, ſhould be given in a very weak decoction; for that after having almoſt abandoned it in conſe-

That claſs of remedies which may be called pure aſtringents, might ſeem at firſt ſight well calculated for caſes of this kind. Of this ſort are the *terra Japonica extractum campechenſe*, and *cortex granati*; but though I have frequently ſeen evident benefit from theſe, there are many caſes in which ſuch medicines are found by experience to be of no material ſervice.

The abſorbent earths are a more uſeful remedy in this form of the diſeaſe. They have, perhaps, a reſtringent effect independent of their power of abſorbing acid. It is certain, however, that great part of their uſe conſiſts in the deſtruction of acid, which is very apt to be generated in that depraved ſtate of digeſtion which takes place in advanced fluxes, particularly in this lienteric ſtate of the bowels. In the early and acute ſtate the vegetable purgatives, ſuch as cream of tartar, tamarinds, and manna, are proper; but in this advanced ſtage they are hurtful by the acidity and flatulence which they

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quence of its failure when he gave it in ſtrong decoctions, and in ſubſtance, he was again convinced of its efficacy by uſing it in a very weak decoction, a ſcruple being boiled in a pint of water to half a pint.

produce,

produce, and both the food and medicines ſhould be ſo calculated as to avert and correct thoſe inconveniencies. There is ſomething in vegetable acids extremely unfriendly to a weak ſtate of the bowels in general, tending to bring on ſpaſmodic gripings, and preventing a healthy digeſtion and aſſimilation, as we know in the caſe of thoſe who are ſubject to heartburn, and of thoſe who make uſe of vinegar to check corpulency, by preventing the formation of blood. Vegetable acids, however, are admiſſible where there is a redundancy of bile, or where the excrements are putrid; and Dr. Zimmerman recommends tamarinds as a uſeful medicine in what he calls the putrid dyſentery.

Lime water has been recommended in old fluxes, and I tried it in ſeveral caſes. Except in one, I could not perceive any benefit from it in the Weſt-Indies, but found it anſwer better in England. I was informed by the late Mr. Adair, ſurgeon-general to the army, that the duke of Glouceſter was cured of a very dangerous lienteric flux by this medicine.

Abſorbents may very properly be combined in preſcription with ſome of the compound-

pound-officinal opiates, and a medicine will thereby be formed, which will have at once the advantage of an anodyne, a bitter, an aſtringent, a carminative, and abſorbent. As theſe earths have little or no taſte, they may alſo be added, with propriety, to the common drink, as in the form of the chalk julep, or *decoctum album*.

I have ſeen benefit in lienteric fluxes from a ſcruple of lapis calaminaris, finely levigated, and given three times a day. I have alſo, in ſimilar caſes which occurred at St. Thomas's hoſpital, found benefit from a yellow gum lately imported from Botany Bay. The doſe was a drachm of the tincture three or four times a-day, made in proof ſpirits, in the proportion of a drachm of the gum to an ounce of the ſpirits.

A proper regulation of diet, as well as medicine, is of the utmoſt conſequence in this diſeaſe. A free indulgence of animal food is pernicious, particularly in the firſt ſtage of it. In the chronic ſtate, a moderate uſe of it is allowable, and in the lienteric ſtate it anſwers better in a ſolid form than that of broth, which is apt to gripe and to run quickly

quickly through the bowels. The beſt general articles of diet are farinaceous bodies; and theſe are greatly improved by being toaſted brown before they are uſed. It was obſerved, in a former part of this work, that the flux was ſuppoſed to have been prevented, in the fleet commanded by Sir Charles Saunders, by throwing burnt biſcuit into the water uſed by the crews of the ſhips. It is a good practice to put a well-burnt toaſt into all that the patient drinks, and toaſted bread, or panada made of toaſted bread or biſcuit, is one of the beſt articles of diet. Brackiſh water ought to be avoided, as it ruffles the bowels when in ſo delicate a ſtate. Fermented liquors are improper, except when the diſeaſe is advanced, and where weakneſs and relaxation are the prevailing ſymptoms. Malt liquor will hardly ever agree, on account of its acidity and flatulence. Of wines, Port is to be preferred as the moſt ſtrengthening; Madeira as the leaſt ſubject to acidity: and, for the common men, no drink of the fermented kind is ſafer than a moderate quantity of ſpirits diluted with water.

Warm

Warm clothing is of the utmoſt conſequence in this diſeaſe, and external warmth of the abdomon tends greatly to ſooth the bowels. I have ſeen good effects from a warm gum plaſter conſtantly worn on that part. Though cold is in general hurtful and unſafe, I have nevertheleſs known the ſailors, who, by their habits of life, are commonly heedleſs, bathe in the ſea when labouring under what they call the white flux, not only without any bad effects, but with manifeſt benefit.

It ſometimes happens that this diſeaſe baffles every effort both of medicine and diet, ſo that a change of climate becomes the only reſource.

The laſt cauſe of habitual flux that was mentioned was the retention of *ſcybala*, which keeps up the irritation and teneſmus. It is very natural to neglect purgative medicines when there ſeems already to be too great a diſcharge by the bowels; but there is this inconvenience from omitting them for a length of time, that thoſe hard lumps of feces, called *ſcybala*, are apt to collect in the

the cæcum and cells of the colon, as I have ſeen upon inſpecting the dead bodies; and the fibres of the inteſtines being weakened, their natural ſtrength is not ſufficient to expel them without being ſtimulated by a purgative. It is therefore neceſſary to give ſome evacuant medicine from time to time, even though there ſhould be no griping nor any marks of acrimony in the inteſtines. Rhubarb is allowed to be one of the beſt medicines for this purpoſe; and I have alſo known a combination of ſalts and ſena have a good effect after a long neglect of purgative medicines. It is probable, from the durable effects produced, that theſe do not operate merely by the expulſion of *ſcybala*; and we can conceive that they may be of ſervice by the removal of certain depraved fluid ſecretions, or that they may ſtimulate the veſſels to a more healthy action, the glands to a more natural ſecretion, and actuate the abſorbents. Be this as it will, experience teaches that in all fluxes it is of advantage to interpoſe from time to time ſome purgative medicine.

From the preceding view of the variety of cauſes which tend to keep up this diſeaſe, it

it will appear that great judgment and diſcrimination are neceſſary in varying the practice according to circumſtances; and there is no diſeaſe in which there is room for more attention and nicety in adapting the different remedies to the different ſymptoms. We can hereby alſo account for the various characters that different remedies have had, ſome having been extolled by one practitioner, while they have been pronounced inſignificant by another; for no one remedy will ſuit all the various caſes of this diſeaſe. As it is of the greateſt conſequence to diſtinguiſh theſe caſes, I have been more particular and diffuſe on this article than any other; and having laboured under this complaint myſelf, I was naturally led to take a greater intereſt in its treatment, and had alſo thereby a better opportunity of making obſervations on it.

CHAP. III.

Of the SCURVY.

I SHALL not be ſo minute, either in the deſcription or treatment of the ſcurvy as of the preceding diſeaſes. A detail of this kind would lead to unneceſſary prolixity and repetition; for the prevention and cure of it, conſiſting in diet rather than medicine, have been fully handled in the narrative part of this work; and the ſubject, in the deſcription, as well as the practical part, has in a manner been exhauſted by Dr. Lind, whoſe treatiſe on this ſubject is more full, judicious, and ſatisfactory, than that of any other author; and this work is more complete in all points, than any other work with which I am acquainted, upon any other medical ſubject.

It has appeared, that the principal ſource of ſcurvy is a vitiated diet, conſiſting in ſalted animal food, the fat part of which is conſidered

conſidered by ſeveral * navigators as the moſt productive of this diſeaſe. It has been ſeen alſo, that it is very much promoted by cold, moiſture, filth, ſloth, and dejection of mind. Hard labour has been aſſigned by ſome as a cauſe; but this is not conformable to my obſervation, and what has been related to have happened in the † Conqueror, as well as other facts which have occurred to others as well as myſelf, more particularly led me to be of a contrary opinion. A fact mentioned in Captain Cook's Voyage to the North Pacific Ocean, may be alſo alledged in favour of this. He remarks, that the Kamſchadales, who were habituated to hard labour, were free from ſcurvy, while the Ruſſians and Coſſacks, who were in garriſon in their country, and led indolent lives, were ſubject to it, though they uſed the ſame ſort of food.

Though this diſeaſe is very ſeldom known except under the uſe of ſalt proviſions, yet theſe are not abſolutely neceſſary to its production. It is known in cold climates un-

* See the Voyages of Captain Cook and Captain Colnett.

† See page 315.

der

der the uſe of diet very ſcanty, though not ſalt; and at the ſame time under the influence of cold, damp, and foul air, and indolence.

There has occurred, in the courſe of this war, a very ſtriking proof that ſcurvy may be produced without the uſe of ſalt proviſions. Portcheſter Caſtle not being capable of accommodating the French priſoners in 1798, part of them were lodged on board of a ſhip in the adjoining creek, and were victualled in the ſame manner as thoſe in the caſtle. Their allowances conſiſted chiefly of freſh animal food and peaſe, without any ſalt proviſions. The true ſea ſcurvy broke out in the ſhip, but not in the caſtle. This, I apprehend, was owing to the more cloſe confinement of the men in the former ſituation, whereby they were deprived of freſh air, exerciſe, and recreation, while the others had the benefit of an airing ground. The ſhip was alſo more crowded, more damp, and leſs clean. Under all theſe diſadvantages, however, the ſcurvy would not have ariſen, had freſh vegetables been uſed; and this is a ſufficient proof, that farinaceous ſubſtances, unleſs in a ſweet or fer-

mented ſtate, ſuch as malt, beer, ſoft bread, or flummery, are not antiſcorbutic.

There ſeems to be ſomething in the habits of life in a ſhip, whether at ſea or in port, favourable to ſea ſcurvy. The ſhips belonging to the channel fleet in 1794 and 1795, were ſubject to the ſcurvy even when at Spithead, though the men were fed with freſh beef and drank beer. This would not happen to men in a garriſon. The difference of theſe ſituations conſiſts, partly in the ſuperior dryneſs, cleanlineſs, and ventilation of the latter; but more, I apprehend, in the want of exerciſe and recreation on board of a ſhip.

The ſcurvy generally begins to ſhew itſelf between the ſixth and ſeventh week after men have been on ſea victualling. The firſt viſible ſymptom is generally ſore gums, which are affected with a ſpungy ſwelling, and bleed upon the leaſt touch. The next moſt obvious ſymptom is, livid blotches or wheals on the fleſhy parts of the legs, under which hard caky ſubſtances are felt. This hardneſs increaſes and extends to other parts as the diſeaſe advances, and

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is conſidered as a mortal ſymptom when it reaches the trunk of the body. Theſe ſymptom ſeems owing partly to coagulated maſſes of extravaſated blood, partly to an *error loci* of the red globules, into the colourleſs order of veſſels, where they ſtagnate. The face has a lurid bloated appearance, and the legs, near the ankles, become ſomewhat œdematous.

The moſt remarkable ſymptoms next to theſe, is a laſſitude and depreſſion of ſpirits. A ſmall degree of exerciſe produces laborious breathing. This, and pains of the thorax, are ſome of the moſt diſtreſſing ſymptoms in the advanced ſtages of the diſeaſe.

Debility and laſſitude increaſe as the diſeaſe advances; and theſe, together with pains of the limbs, and contractions of the hams, confine the diſeaſed perſon to bed; and any rough motion, or an attempt to raiſe himſelf to the erect poſture, is apt to bring on ſyncope.

In the moſt advanced ſtages of the diſeaſe, they frequently expire on occaſions of

this kind, or in the act of carrying them on ſhore for cure, upon their arrival in port. In the ſame ſtage of it, the callus of broken limbs is diſſolved or abſorbed, ſo that the part comes to be in the ſtate of a recent fracture.

The appetite for food is in general unimpaired in every ſtage of this diſeaſe. The urine is ſcanty, and high coloured.

When a part is bruiſed in any ſtage of this diſeaſe, and even before the diſeaſe ſhews itſelf by viſible ſymptoms, there follows a tumour which is found to be filled with liquid blood; and any wound, however ſmall, eſpecially in the lower extremities, is apt to fall into a foul ulcer, very difficult of cure. There is a great tendency to hæmorrhage, either ſpontaneous or upon the ſmalleſt injury.

The ſkin becomes dry and rough, indicating a want of perſpiration. Beſides the livid ſpots already mentioned, there are ſmall ſpecks, generally of a purple colour, very little raiſed above the ſurface of the ſkin. There are no cutaneous eruptions of the ſcabby,

ſcabby, moiſt, or purulent kind, as in impetiginous affections, or what is ſometimes called land ſcurvy; and it is here proper to obſerve, that the ſea ſcurvy, neither in its ſymptoms nor nature, has the leaſt ſimilitude or affinity to cutaneous affections, or any other complaints met with at land.

There is a remarkable ſymptom ſometimes attendant on this diſeaſe, which has eſcaped the notice of authors. This is the *nyctalopia* mentioned in Mr. Telford's report *. It was alſo common in the garriſon of Gibraltar, among thoſe affected with the ſcurvy during the ſiege, as I was informed by Mr. Cairncroſs, ſurgeon to one of the battalions. It ſometimes takes place in that incipient ſtate of the diſeaſe, which does not ſhew itſelf by any viſible ſymptom, but betrays itſelf, as mentioned above, by *ecchymoſis* in caſe of bruiſes, or by ſcorbutic ulcers.

But I ſhall not purſue the deſcription of this diſeaſe into its minute ſymptoms and varieties, but refer the reader to Dr. Lind's

* Vide page 6.

work, thinking it ſufficient here to have enumerated ſuch appearances as may convey a juſt idea of it, and enable one unacquainted with the diſeaſe to recogniſe it.

The moſt ſtriking appearances upon examining the bodies of thoſe who die of it, are a tender ſtate of the muſcular fibres, which are eaſily broken or lacerated, large effuſions of coagulated blood into the cellular membrane, an acrid fluid in the cavity of the thorax and abdomen, a ſeparation of the cartilages and epiphyſis from the bones, and an enlargement of the cavities of the heart. The ſenſible qualities of the blood are found but little different from what they are in healthy ſubjects.

With regard to the prevention and cure, enough has been ſaid in the preceding parts of this work, to prove that freſh vegetables and lemon juice are the only effectual antiſcorbutics. I ſhall here mention a fact farther in proof of the effect of vegetables. When the fleet arrived at Barbadoes in May 178:, part of the ſoldiers, who ſerved as marines, were affected with the ſcurvy; and being ſent to the army hoſpital, where at

at that time no fresh animal food was allowed, they recovered much faster by being confined to vegetable articles alone, than the seamen who were fed upon fresh animal food without any fresh vegetables.

It has appeared that the juice of a particular class * of fruit far surpasses every other remedy, whether dietetic or medicinal. It is difficult to decide under which of these heads it should be reckoned; but its powers in both respects are so eminently and singularly efficacious, as not to be equalled by the virtues of any other remedy as yet known in any other disease. When the shortness of time also, as well as the certainty of its effects, and the small quantity in which it operates are considered, it comes nearer to the description of what is vulgarly called a *charm*, than any other medicinal article with which we are acquainted.

* It has been mentioned before, that this class is the hesperidæi; but it is to be remarked, that they are medicinal only in an acid state, for sweet china oranges have been known to fail in curing the disease.

It requires but few words to convey an idea of the great benefit derivable to the ſervice from the proper application of this remedy. It muſt be obvious to every one, that whatever enables a ſhip of war to keep the ſea double the time this could otherwiſe be done, as has been found to be the caſe this war (1799) both at home and abroad, muſt give a double efficiency to ſuch a ſhip for the purpoſes of war, and muſt enable ſingle ſhips and ſquadrons to proſecute certain ſervices, to which they would otherwiſe be inadequate. A ſhip ſupplied with lemon juice, can keep the ſea for four months with leſs detriment to the health of the men, than for two months without this article of refreſhment. Beſides the advantage of this upon long voyages, it is evident that in cruizes alſo, the benefits are incalculable, and too obvious to require being ſpecified. It may alſo be remarked, that without this aſſiſtance to the health of mariners, war and commerce could not avail themſelves of certain contrivances peculiar to this age, highly important to navigation, and honourable to human ingenuity. I allude to the lunar obſervations, and time-pieces for aſcertaining the longitude, whereby

by ſhips can proſecute a voyage of any length without making the land; and alſo to the ſheathing in copper, whereby the neceſſity of frequent careening is ſuperſeded. Were it not for the reſource of lemon juice, the health of men could not keep pace with theſe improvements; for in former times, long and frequent ſtays in port were neceſſary for the health of the men, as well as the repairs of the ſhip.

The introduction of this article may therefore be conſidered as an æra in the internal œconomy of our navy. It is, however a curious fact, though mortifying to human wiſdom, and to our national ſagacity, that the virtues of this remedy were equally well known in the beginning of laſt century as they are at this moment; yet it has never till now attracted the attention either of medical men or of ſea officers, to the degree it ought; inſomuch that it had, in a great meaſure, fallen into neglect, when the knowledge of it was revived, and its character retrieved, by the writings of the late Dr. James Lind, phyſician to Haſlar hoſpital. It has at laſt attained the eſtimation it deſerves; and the

Britiſh

Britiſh navy is now availing itſelf to the utmoſt of this ineſtimable reſource *. It is now a regulation in fitting out ſhips, not only to put in the ſurgeon's cuſtody a ſufficient quantity for the ſick, but there is enough put in the cuſtody of the purſer, either for the whole crew, or for men who, though ſtill fit for duty, have obſcure ſymptoms of

* It may be here worth while to relate in what manner the late general introduction of lemon juice into the navy was effected. In the end of the year 1793, rear admiral Sir Allan Gardner, then one of the lords of the admiralty, having been nominated to the command of a conſiderable ſquadron deſtined to the Eaſt Indies, conſulted me on the medical arrangement of it; and I adviſed him, among other matters, to apply for a large ſupply of lemon juice. This he did, and obtained it; but this expedition having been laid aſide, and a much ſmaller force having gone out ſoon after under the command of rear admiral Rainier, there was more than a ſufficient quantity of this article to ſupply the whole crew of the flag ſhip, which was the Suffolk of 74 guns. This proved a voyage of nineteen weeks without touching at any port, and without any ſupply of freſh proviſions; yet upon the arrival of the Suffolk at Madras, there were only fifteen upon the ſick liſt, none of whom were affected with ſcurvy. In conſequence of this report, and the good effect of it on ſome ſhips of the channel fleet, to which part of admiral Gardner's ſtock had been ſpared, the general ſupply mentioned above was ordered. The quantity given daily to each man was three quarters of an ounce, with two ounces of brown ſugar.

ſcurvy.

ſcurvy. It was originally intended that the whole ſhip's company ſhould at all times be ſupplied with it after the ſmall beer was expended; but the difficulty of procuring a ſufficient quantity, owing chiefly to the war with Spain, which broke out at that time, gave occaſion to the partial ſupply above-mentioned, and the general ſupply is limited to remote voyages and particular ſervices.

It may here be aſked, how it comes to paſs that mercury and the venereal diſeaſe are conſtantly coupled together, in the mouths even of thoſe who do not belong to the profeſſion, while a like relation between lemon juice and the ſcurvy has had ſo much difficulty to make its way in the world as a popular and eſtabliſhed fact, a fact not only curious and intereſting in a medical and natural view, but highly important as a matter of national concern. It may therefore be ſafely affirmed, that had ſuch an aſſociation of ideas been eſtabliſhed in the mind of ſea officers, it would have ſaved the lives of many thouſands of mariners.

It is difficult to account for this; but it may be owing partly to this circumſtance, that ſociety in general not being obnoxious to the ſea ſcurvy as it is to the other malady, the cure of it is not a matter ſo generally intereſting; partly perhaps to this, that while the one remedy is a ſimple production of nature, not promiſing any extraordinary medical virtues, nor ſuch a diſtinctive pre-eminence over other acids, the other is a profeſſed article of the *materia medica*, being a mineral prepared by chemical proceſſes, and acting powerfully and ſenſibly on the animal œconomy.

As there are few ſituations in which freſh fruit can be procured, it will be neceſſary that the lemon or lime juice intended for the ſea ſervice, ſhould be preſerved in bottles, mixed with a tenth part of ſpirits of wine, or any ardent ſpirits, to prevent it from ſpoiling. Simple expreſſion, and clarification by the ſubſidence of the impurities, is all the preparation it ſhould undergo. If fire is uſed in preparing it, as in the form of a rob, I know for certain that its virtues are thereby deſtroyed.

The

The doſe, as a preventive, may be ſomewhat leſs than an ounce in the day; in ſlight caſes, two or three times as much; and in the worſt caſes, it may be given to the quantity of a pint daily. It is remarkable, that this quantity, and even a much larger, produces no diſturbance in the ſtomach, as it would do in the ordinary ſtate of health.

During the war in which I ſerved, the fleet was furniſhed with eſſence of malt, but the powers of it were found ſo inconſiderable, that ſome of the ſurgeons denied that it had any. In trials, however, which were made in an early ſtate of the diſeaſe, it was found, like all other ſweet juices, to have a ſenſible effect in checking and removing it. It was alſo found of evident uſe in the bad ulcers, ſo apt to ariſe in ſcorbutic habits; and in this intention was ſuperior to the Peruvian bark as an internal alterative. It is however, in this and all other points, ſo much inferior to lemon juice, that it is now aboliſhed as a matter of unneceſſary expence.

Though

Though vinegar, and other vegetable acids, will not cure the diſeaſe, without the aſſiſtance of freſh and vegetable diet, and therefore not in the leaſt to be compared to lemon juice, yet there are proofs of its ſenſibly retarding the progreſs of it. A fleet of ſhips employed in the India commerce, having made a tedious voyage from China to St. Helena, were all affected with the ſcurvy in a high degree, except one ſhip, in which the only difference in the treatment of the men, conſiſted in mixing vinegar with the water uſed as common drink.

In ſhort, there is nothing yet known except lemon juice, which poſſeſſes any certain and conſiderable curative power over this diſeaſe without the aſſiſtance of proper diet. With this aſſiſtance, however, it is found, that whatever tends to encreaſe the fluid ſecretions, haſtens very much the recovery of the ſcorbutic patient. I have ſeen a very ſtriking proof of this in the effects of a ſpontaneous diarrhœa; for I have obſerved thoſe hard livid ſwellings on the legs, that form one of the moſt conſtant ſymptoms of this diſeaſe, almoſt diſappear, and the hams,

from being contracted, become flexible in the courſe of twelve hours after the purging came on. I have endeavoured to imitate this with hydragogue purgatives, ſuch as jalap combined with cream of tartar, but never with the ſame effect as the natural looſeneſs. A free flow of urine is alſo found to promote recovery, and vinegar of ſquills is one of the moſt effectual medicines in this intention. Spruce beer has been found a very efficacious preventive, and cure of this diſeaſe, and it probably acts not only as a fermented liquor, containing a large quantity of carbonic acid, but by the diuretic effect of the eſſence of ſpruce.

Medicines exciting ſweat have alſo been found of ſervice. It has already been remarked, that an obſtruction of perſpiration is one of the principal conſtituents of the diſeaſe, and the gooſe ſkin, as it is called, which is an early and conſtant ſymptom, ſeems to be owing to a conſtriction of the exhalant veſſels. The ſudorific medicine, called * Dover's Powder, has been employed with advantage, with decoction of

* The *pulvis ipecacuanæ compoſitus* of the laſt London Diſpenſatory.

the

the woods drank warm, and plentiful warm dilution. Camphor, combined with nitre, has been found one of the beſt remedies, and it acts both as a ſudorific and diuretic *.

Such external medicines as relax the ſkin, are found alſo to forward the cure. The contraction of the hams, the livor and hardneſs of the calves of the legs, are removed by emollient cataplaſms. Burying the legs in the earth has a good effect, and ſeems to act on the ſame principle, for it makes the part ſweat profuſely in a hot climate, as I was informed by Mr. Stokoe, ſurgeon of the Vengeance, who occaſionally employed this method of relieving the ſcorbutic men.

* A new remedy has lately been recommended by Mr. David Paterſon, a ſurgeon in the navy. It conſiſts of vinegar and nitre given together. He aſſerted the efficacy of it in ſuch ſtrong terms as a cure for ſcurvy, even when men were upon ſea diet, that his account of it was printed by the commiſſioners for ſick and wounded ſeamen, and diſtributed to the ſurgeons of the navy. Several favourable reports have been made of its efficacy, but ſome others have been unfavourable. It ſeems to be the beſt remedy merely medicinal, next to lemon juice, to which nothing can in the leaſt be compared; but as it cannot always be procured in ſufficient quantity, it is proper that medicines, though of inferior efficacy, ſhould be made known.

The

The mere living on ſhore has a great effect in expediting recovery, inſomuch that I have known men under tents in unfrequented iſlands, recover with very little change of diet. This depends moſt probably on the effect of novelty and recreation on the mind, and ſeems a proof among others, that it is a diſeaſe conſiſting in a torpor of the living fibre, rather than a morbid ſtate of the fluids *.

* This reminds me, that it may be here objected, that I have not entered into the theory of this diſeaſe. I ſhall ſhortly ſtate what occurs to me as the moſt plauſible account of what is called the proximate cauſe of this diſeaſe, and the *modus operandi* of its remedies.

From the preceding deſcription of the ſymptoms and morbid appearances, this diſeaſe ſeems to conſiſt in a defect of the living tone, and irritability of the fibres in general, particularly thoſe of the vaſcular ſyſtem; and alſo a diminution of their ſimple elaſticity and coheſion. The general languor and debility, the tendency to diſtenſion, and rupture in the veſſels, indicated by the *error loci*, the ſanguineous and ſerous effuſions giving occaſion to the various diſcolorations of the ſkin, and the ſeveral congeſtions that have been deſcribed, the dilatation of the heart, the ſluggiſh circulation, and the ſtagnation of the fluids in the extreme veſſels, are circumſtances which all concur in ſuggeſting the cauſe that has been aſſigned.

The unnatural diet and other cauſes which induce this diſeaſe, ſeem to operate by a want of that excitement which is neceſſary to the healthy action of the veſ-

ſels, both through the medium of the ſtomach, as an organ of univerſal ſympathy, and by producing vitiated fluids.

The operation of lemon juice will therefore be to excite the energy of the living fibres, more particularly the extreme veſſels and abſorbents, in the ſame manner as theſe laſt are acted upon by hydragogue purges, which excite abſorption in caſe of anaſarcous ſwellings of the extremities, without being *materially* preſent there; but in conſequence of impreſſions on the ſtomach and bowels.

The knowledge of abſorption, as a power in the animal ſyſtem, is daily extending itſelf. Mr. J. Hunter has ſhewn, that it is a neceſſary agent in growth, as all the ſolid parts muſt be removed by it, in order to give place for the formation of organs on a larger ſcale *. It is proved by a proceſs of reaſoning, founded on obſervation and experiment, that moſt if not all the organs of the body undergo more or leſs renewal by the ſame means, even in an adult ſtate; ſo that probably one of the principal morbid changes in ſcurvy, conſiſts in the want of this ſalutary renewal, and the operation of its remedies conſiſts in the reſtoration of it, by re-animating the circulating and abſorbent veſſels.

Lemon juice, conſidered in this view, may be deemed a *medicine*; but, on the other hand, as there can be no doubt that the fluids are more or leſs depraved by the putreſcent and alkeleſcent diet, the chemical correction of theſe muſt be aſcribed to it as a *dietetic* modifying the alimentary matter.

I am glad thus to eſcape from the ſlippery paths of theory, having no great confidence in the accuracy, nor conviction

* See ſome new illuſtrations of the application of the doctrines of abſorption to pathology, and the operation of medicines, in the ſecond volume of a work, entitled, Zoonomia, by Dr. Eraſmus Darwin.

CHAP. IV.

Of Ulcers.

There is no complaint more hurtful to the public ſervice by ſea and land, nor more afflicting to the individual, than ulcers. The legs are the chief ſeat of thoſe which are ſo deſtructive to ſoldiers and ſailors. This ſeems to ariſe, not only from theſe parts being more expoſed to injury, but from their poſſeſſing more imperfect powers of reſtoration, in conſequence of their diſtance from the centre of circulation,

conviction of the utility of ſuch ſpeculations. It ſeems at leaſt, in this caſe, to illuſtrate the various views which may be taken of the efficacy of the remedy in queſtion, and to ſhew how far it not only ſurpaſſes every other remedy in this diſeaſe, but every other commonly reputed a ſpecific in any other diſeaſe, while it has further the ſingular advantage of being a certain preventive.

tion, and from the incumbent weight and languid motion of the fluids, in conſequence of gravitation. In confirmation of this * it has been aſcertained, by an arithmetical compariſon, that tall men are moſt ſubject to ulcers.

Thoſe engaged in the public ſervice are more liable to them than others, from the hardſhips of ſervice, the intemperance of weather and climate, the nature of their aliment, infection from each other, and not unfrequently from their own endeavours to excite or aggravate them by irritating applications, with a view to get rid of the ſervice.

Seamen being more particularly expoſed to ſome of theſe cauſes, the cure of ulcers is one of the moſt important branches of practice in the ſea ſervice, inaſmuch as they conſtitute ſome of the moſt frequent, tedious, and painful diſeaſes incident to a ſeafaring life; and not only diſtreſs the ſervice by a temporary loſs of hands, but are the

* This is a remark of Mr. Home's, in his Practical Obſervations on Ulcers, on the authority of Dr. Young, phyſician to the army.

moſt common cau'e of the final and entire loſs of men, after a long ſeries of expence, trouble and inconvenience.

Though I am, in ſome reſpects, but ill qualified for treating this ſubject, as the immediate care of ſuch caſes did not lie in my department, yet as a treatiſe on the diſeaſes incident to ſeamen would be imperfect without comprehending this ſubject, and having had opportunities in my public ſituations, from obſervation and converſation, as well as from the examination of ſurgeons returns and journals, of gaining information concerning it, I think it my duty to communicate to the public what I have learnt on a matter of ſo great importance. This I ſhall do as conciſely as poſſible; confining my attention to that ſpecies of ulcer occurring in the ſea ſervice, referring the reader for farther information to a * work lately publiſhed, in which the author diſplays much accuracy in his reaſoning on the nature and diſtinction of ulcers, as well as great judgment in

* Practical Obſervations on the Treatment of Ulcers of the Legs, conſidered as a Branch of Military Surgery. By Everard Home, Eſq; F.R.S. ſurgeon to the army, and St. George's hoſpital. London 1797.

their treatment, as far as I am capable of judging.

It is found, from direful and multiplied experience, that not only thoſe who are affected with actual ſymptoms of ſcurvy, but thoſe who are expoſed to the cauſes of it, and whoſe conſtitution is in ſuch a train as to fall into it, are peculiarly ſuſceptible of ulcers of the moſt malignant kind, from the ſmalleſt injury which breaks the ſkin. This might naturally be expected, from what has been ſaid of the great debility of the fibres, and the deficiency of the powers of renovation and nutrition in this diſeaſe.

The characteriſtic ſymptoms of ſuch ulcers, are, a thin fetid diſcharge, commonly mixed with blood, which ſometimes coagulates on the ſurface. The ulcerated ſurface is ſoft and ſpongy, generally elevated above the level of the ſurrounding ſkin, particularly about the edges, where there are excreſcences of luxuriant fleſh, which, in the more advanced ſtate of the ulcer, ſhoots into a ſoft bloody *fungus*, called by the ſailors *bullocks liver*.

Beſides

Beſides the diet peculiar to a ſea-faring life, I have now to mention another circumſtance, which has not been much attended to, though it has greatly favoured the ſpreading of ulcers in ſhips of war.

From obſerving, in the late war, that ſome ſhips were much more ſubject than others to ulcers, though in the ſame circumſtances in point of climate, victualling, and the duties of ſervice, I was led to an opinion of their being infectious. Some facts that have occurred in this war, have put this beyond all doubt.

From what has * already been ſaid reſpecting infection, it ſeems difficult to aſcertain what diſeaſes may be the ſubjects of it. It would appear that there is a tendency in all morbid ſecretions, whether fixt or volatile, to ſtimulate ſimilar parts in other ſubjects of the ſame ſpecies, to a like action, and to a production of the like matter. As a certain concurrence of circumſtances is neceſſary to render any diſeaſe whatever contagious, there may be ſome that are ſo rarely ſo, as not to be conſidered

* See pages 214 & ſeq. and 270.

as at all of this nature. The doubts that have arisen concerning the existence of almost every contagion *, have proceeded from its being observed, that no contagion or infection whatever affects every person indiscriminately, who is exposed to it, and that it does not take effect, except under a concurrence of certain circumstances of constitution, habits of life, air, and other undefinable particulars, all and each of which are indispensable in bringing about the effect. A number of delicate and accidental coincidences being necessary to constitute these conjunctures, and the application of infectious matter being only one of these, it is evident how it comes to pass that numbers who are exposed are not affected, and how certain diseases may not be at all infectious, except in circumstances which but rarely occur. Dr. Lind has brought together a number of † facts, from which it is difficult to deny, that the sea scurvy itself may not sometimes be so; and proofs in favour of the same have occurred in my ser-

* See page 217.

† See Treatise on the Scurvy, page 271, third edition.

vice.

vice *. Judging from a groſs view of the nature and hiſtory of this diſeaſe, we ſhould be apt, *a priori*, to reject the poſſibility of this. But it ſeems extremely unphiloſophical to deny the reality or poſſibility of any thing in nature, from our ſuppoſed knowledge of the means and cauſes ſhe employs, particularly in a branch of ſcience ſo obſcure as the animal œconomy. Could we therefore prove the point as a matter of fact, it would be in vain to controvert it upon arguments derived from our fancied acquaintance with nature's modes of operation.

With regard to ulcers, however, this objection does not apply; for it is evident, from the *fœtor* they diffuſe, that there is a ſufficient quantity of effluvia afloat in the air to ſerve as matter of infection, and to leave no difficulty in conceiving how it may be conveyed and applied.

The truth of this poſition will beſt be evinced, by bringing in proof of it, a few facts out of many that might be adduced to the ſame effect.

* See page 96.

The

The Ganges, of ſeventy-four guns, and ſix hundred men, arrived from the Weſt Indies in the month of October 1796, with a great many foul ulcers on board, to which the crew had been ſubject for ſeveral months before leaving the Weſt Indies. She was for ſome time at Spithead, under the uſe of freſh proviſions, and again at Yarmouth, but the ulcers continued to multiply. She ſailed on a cruize to the North Sea on the 2d of June 1798, with only two ulcers on board. During this cruize they prevailed more than ever; and as a proof that this was owing to infection, and not to a conſtitution depraved by ſea diet, the ſurgeon remarked, that the new raiſed men taken on board at Yarmouth (of whom a great number were neceſſary, in order to replace thoſe diſabled by ulcers) were much more liable to them than the old ſeamen from the Weſt Indies. This complaint continued till January 1798. It then ceaſed; and the means which ſeemed to have the principal ſhare in putting a ſtop to it, were the ſending every caſe to the hoſpital as ſoon as it appeared, a ſtrict attention to cleanlineſs, and a ſupply of vegetables. From the arrival of this ſhip in England till this time, two hundred and eighteen

eighteen caſes of ulcers were ſent to different hoſpitals.

The propenſity to this complaint was ſuch, that the ſmalleſt ſore, whether from a hurt or a pimple, fell into the ſtate of an ulcer. Bliſtered parts alſo were affected in the ſame manner. Sores, which ſeemed to be in a healing ſtate, would ſuddenly become gangrenous. A black ſpeck in the middle was the conſtant forerunner of this.

The men who ſlept near the ulcered patients, were moſt apt to be ſeized with them; as alſo the centinels and nurſes who were about them. The inciſions of thoſe who underwent ſurgical operations, and were placed among them, aſſumed the ſame ulcerous ſtate; while thoſe who were placed in a remote part of the ſhip healed in a kindly manner.

Thoſe ulcers were attended with ſymptoms of the moſt virulent and malignant kind. They began with violent inflammation, which ſuddenly terminated in mortification; deſtroying in a ſhort time the fleſhy parts,

parts, ſo as to expoſe the bone, which ſoon became carious. They had all the characters of the worſt ſort of ſcorbutic ulcers, but they took place in conſtitutions in which there was no other ſymptom of ſcurvy, nor did they yield to lemon juice *.

The Triumph, of ſeventy-four guns, and ſix hundred and fifty men, had been employed during the greater part of the war on the coaſts of Great Britain and Ireland. During ſummer and autumn 1798, ſhe was chiefly employed in cruiſing on the coaſt of Ireland; and in that time the crew was ſubject to malignant ulcers. Eighty-four were put on the ſick liſt from May to December, both months included. Not only wounds and bliſters fell into the ulcerated ſtate, but a ſcratch or boil, and the orifice of the arm after bleeding, were ſubject to the ſame accident. Sores, which ſeemed to be in a healing ſtate, would ſuddenly, and without any viſible cauſe, ſpread again, and become foul and bloody, extremely painful, and reſiſting every means of cure. This unfa-

* This account is taken from the journal of Mr. Duncan Macarthur, ſurgeon of that ſhip.

vourable

vourable change always began, as in the Ganges, with a black ſpot in the middle of the ulcer, a ſymptom which ſeems peculiar to this infectious ſort. The manner in which they begin, is alſo characteriſtic of their nature. The ſurgeon of the Triumph agrees with the other gentlemen, in deſcribing their beginning as attended with violent local inflammation, great heat, and a full and ſtrong pulſe for ſeveral days *.

An incident occurred, about two months after the men belonging to the Triumph had been ſent to the hoſpital ſhip at Cork, which affords a farther proof of their infectious nature. Twenty-ſeven of theſe men were ſent from thence as invalids to Plymouth, in the * Atalanta ſloop of war. The ſame ſort of ulcer ſpread among the crew of this ſloop, ſeven of whom were affected with it during the paſſage.

Ulcers of the ſame kind prevailed to the moſt dreadful degree in the ſhips ſerving at

* This account is taken from the journal and letter of Mr. Thomas Moffat, ſurgeon of this ſhip.

† Weekly report of that ſhip, 8th December 1798, by Mr. Arthur French.

the

the Cape of Good Hope, and the naval hoſpital there, in the years 1796 and 1797, producing the moſt ſevere and protracted ſufferings, terminating frequently in the loſs of limbs or life, or both. Nor were they confined to the lower extremities, ſo that the *oſſa ilium*, the *ſcapula*, and *cranium*, would ſometimes become carious. Their deſcription is the ſame as has already been given; but in addition to the ſymptoms already enumerated, the lymphatic glands in the ham and groin ſometimes ſwelled; the buboes in the latter ſuppurated, and they not only healed kindly, but the ulcers of the legs looked better while this ſuppuration continued *, Theſe ulcers were much more prevalent in ſome ſhips than in others; and they did not ariſe in any of them on their firſt arrival, at a time when the men were moſt highly ſcorbutic, but ſome weeks afterwards, though they had the advantage of the refreſhments of the country; and they could, in ſome inſtances, be traced from the

* Theſe facts are taken from a letter of Mr. M'Allum, ſurgeon to the hoſpital.

intercourſe

intercourſe of one † ſhip with another. I was informed by the ſurgeon of one of the ſhips of the line on that ſtation, that ſome men having been ſent from thence to the hoſpital for the cure of other complaints, they were ſeized with malignant ulcers originating from ſcratches or ſlight ſores; although no ulcers of that deſcription prevailed on board of the ſhip at that time, and although the men had the advantage of freſh and vegetable diet at the hoſpital. Theſe circumſtances are all in favour of their proceeding from infection, and not from climate, nor any thing peculiar in the circumſtances of the ſervice on that ſtation.

It became frequently neceſſary to amputate at this hoſpital; and it was obſerved, that if the patients who underwent the operation, remained in the wards with the ulcers, few ſurvived, owing to the gangrenous and ulcerous ſtate of the ſtumps; but when

† Two bad ulcers, which were on board of the Truſty of 50 guns, when ſhe arrived at the Cape, were ſoon afterwards cured; and the bad ulcers firſt appeared again in ſome men, upon their return from a ſhip to which they had been lent.

they

they were carried into a ſeparate apartment, there were very few of them who did not recover.

It was obſerved, both in the ſhips and at the hoſpitals, where this ſpecies of ulcer prevailed, that the hands of thoſe who dreſſed them, when the ſkin was broke, fell into the ſame ſort of ulcer.

The contagious matter of ulcers, like all other infections, ſtimulates thoſe parts only which are ſimilar to thoſe of the ſubject which produced it. Except therefore where the matter or effluvia lights on a ſuppurating ſurface, it does not appear that it proves at all noxious to health. It cannot fail of being drawn into the lungs, or ſwallowed with the ſaliva, yet no bad effect enſues; for many ſhips companies, affected with this complaint, were extremely healthy in all other reſpects.

It reſembles the ſpecific infections, producing febrile complaints, in this reſpect, that the parts become inſenſible to it after a certain time, like the ſmall-pox, for they take on a healing diſpoſition; but it differs from

from them in this reſpect, that after a certain time theſe parts recover their ſenſibility to its action, and again fall ſuddenly into the foul ſpreading gangrenous ſtate, as is mentioned in all the accounts of this complaint.

Whether this infection depends in all caſes on a concentrated ſtate of the effluvia of ſcorbutic ulcers, or if it is generated by the peculiar diſpoſition of individual caſes, is a queſtion I am not able to reſolve; but I hope its hiſtory has been ſufficiently inveſtigated, to lead to ſome valuable practical inferences with regard to the prevention and cure of theſe ulcers.

Of the Prevention of Malignant Ulcers.

1. As ſeamen are extremely neglectful of themſelves, and as it is of more conſequence in this than perhaps any other complaint, to watch the firſt beginnings of it, the utmoſt care ſhould be taken to find out ſuch men as have ſmall ſores from hurts or otherwiſe, in order that they may be cured before they fall into the ſtate of ulcers. This

ſhould be one of the principal objects in the reviews of the ſhip's company, recommended to be made by the ſurgeon *.

2. As the peculiar ſuſceptibility of ſailors to this complaint, in the firſt inſtance, is no doubt owing chiefly to their diet; they ought to live on freſh proviſions and vegetables, as much as the nature of the ſervice will allow; and in long cruiſes and voyages, where theſe cannot be procured, there ought to be an ample ſupply of lemon juice.

3. The parts liable to them ſhould be properly defended and ſupported. Shoes and ſtockings ſhould be conſidered as neceſſary articles of ſeamen's clothing. Independent of defence, whatever compreſſes and ſupports ſoft parts, has been found to prevent ulcers. In the army, thoſe ſoldiers who wear gaiters are much leſs ſubject to them than others. For the like reaſon, in order to prevent the relapſe of caſes nearly recovered, either a tight bandage, or ſomething to buckle or button on the part, is a very uſeful precaution. It is probably

* See page 241.

owing

owing to the natural tenſion of the integuments, that the ſoles of the feet, though ſo much expoſed, are very ſeldom the ſeat of ulcers, and that they are eaſily cured when they do ariſe.

4. In ſo far as reſpects this ſpecies of infection, the ſame means ought to be employed to eradicate it, as has been recommended with regard to the infection of fever *. I have brought together ſuch arguments in proof of the infectious nature of ulcers, as, I apprehend, are incontrovertible; and my anxiety on this point has proceeded from a conviction of the great importance of eſtabliſhing this, with a view both to prevention and cure, and from being perſuaded that ſome of the moſt important means of prevention and cure have been overlooked, from the ſubject not having been conſidered in this light. In both points of view, the primary objects of attention are, ventilation, cleanlineſs, and ſeparation. It is very rarely that this infection exiſts but in large ſhips, or in the wards of hoſpitals, where there are a conſiderable

* See Part II. Sect. iii.

number in one apartment, producing a concentrated effluvia; and the moſt important point is, that there ſhould be as few as poſſible within each others atmoſphere. Every poſſible effort ſhould be made to thin and ſeparate ſuch caſes, by not bringing them together into one part of a ſhip, and by diſperſing them in ſeparate apartments at an hoſpital, ſending them to private quarters, or even putting them under tents. It was obſervable, that ſome caſes of this kind did better in tents in the iſland of Madagaſcar, under all the inconveniences of theſe temporary accommodations, than in the regular and well appointed hoſpital at the Cape of Good Hope.

Another uſeful precaution, founded on their being infectious, is, that the utmoſt care ſhould be taken not to convey any of the infectious matter from a foul ſore to a clean one, by the hands of the dreſſer, or the inſtruments, utenſils, or dreſſings they employ. A ſmall recent clean wound has been known to fall into the ſtate of a foul ulcer, by being waſhed with the ſame ſponge which had been uſed to an ulcer of that deſcription.

Of

Of the TREATMENT of MALIGNANT ULCERS.

The remedies for ſcorbutic ulcers may be ranked under the heads of air, diet, exerciſe, internal medicines, and external treatment.

The neceſſity of pure air toward the cure of ſevere accidents, and the ſucceſs of capital operations, has already been ſtrongly ſtated *. But in addition to the general expediency of ventilation and cleanlineſs, in promoting healthy ſuppuration and cicatriſation, there is in the preſent caſe a ſpecific infection to be counteracted, which it is here peculiarly requiſite to do, inaſmuch as this not only ſpreads the diſeaſe, in common with other infectious matter, but retards the cure, and keeps up the malignity of the complaint. What has been ſaid therefore under the head of prevention, regarding cleanlineſs, ventilation, and the ſeparation of the ſick, is equally applicable here, and cannot be too often repeated and in-

* See page 177.

culcated. It has indeed appeared clearly from the preceding hiſtory of theſe ulcers, that to attempt the cure of them without pure air, is like building without a foundation; for all other means without this, are either ineffectual, or afford only a temporary and precarious relief. We have ſeen, that after all that ſkill and attention could do in the Ganges and Triumph, and in the hoſpital at the Cape, the whole labour was frequently loſt by ſudden relapſes, from the ſores being continually expoſed to each others effluvia.

As the ſcorbutic habit which renders ulcers ſo malignant, is contracted chiefly by ſea diet, it is obvious that freſh vegetables, and particularly the acid juices ſo often mentioned, will be eſſentially neceſſary to their cure. In thoſe caſes, however, which are infectious, this change of diet will not effect a cure, as was found at the hoſpital at the * Cape of Good Hope, as well as other places, where their malignity continued after the long and free uſe of vegetables and fruits. However eſſential, there-

* Letter from Mr. M'Callum, ſurgeon to that hoſpital, dated 1ſt June 1797.

fore, freſh and vegetable diet may be, pure air procured by ventilation, cleanlineſs, and ſeparation, are ſtill more ſo.

The next head in the enumeration of the means of cure, is exerciſe. In this there is ſome difference of opinion among practitioners of experience; ſome recommending the confinement of patients with ulcers to their beds, while others recommend exerciſe in the open air. It would ſeem that the former are right with regard to ulcers, in what may be called their acute ſtage, while ſpreading, and in a ſtate of high inflammation; while the method of the latter ſeems adviſeable in the ſtationary or convaleſcent ſtate of them. It is more particularly adviſeable in the method of treating ulcers, invented by Mr. Bainton, and to be deſcribed hereafter. There can be no doubt that this muſt be of advantage, in ſo far as it is conducive to general health, and in ſo far as it withdraws the patient from the atmoſphere of others labouring under the ſame indiſpoſition; but whether the whole benefit depends on this, or whether a certain degree of motion is ſalutary to the part, is difficult to determine. Mr. Home

remarks, that thoſe cures are more permanent which are effected under the uſe of exerciſe.

With regard to internal remedies, the moſt judicious practitioners in the navy are of opinion, that lemon juice, bark, and opium, have been found to poſſeſs the greateſt power over ulcers. In the inflammatory ſtage, which has been deſcribed, they think that though there is a gangrenous tendency, yet that rich nutriment, wine, bark, and all tonics as well as cordials, are pernicious, excepting opium, and that an antiphlogiſtic plan of treatment anſwers beſt in this acute ſtate. When the feveriſh ſtate has ſubſided, theſe means are then admiſſible. In ill-conditioned ulcers in general, opium has been found ſuperior to bark in producing a diſpoſition to heal, and in converting the thin ichorous diſcharge into a healthy ſuppuration, which it probably does by ſuſpending irritation and pain, and perhaps by promoting that abſorption by which good pus is thickened. Opium may therefore be conſidered as the moſt valuable of all the means which are purely medicinal. The employment of it not only

as

as a palliative for the temporary removal of pain, which uſed to be conſidered as its only uſe, but as a powerful means of correcting the worſt diſpoſed ulcers, and even of counteracting gangrene in ſome caſes, by a continued and free adminiſtration of it, is one of the principal improvements in modern practice. This is conſpicuous, not only in the ulcers in queſtion, but in the phagedenic, buboes, which are almoſt the only fatal termination of the venereal diſeaſe, for theſe are ſo much under the controul of opium, as ſeldom to be found incurable and mortal where it is properly employed.

It is neceſſary again to repeat here, that in the infectious ulcers exiſting independently of ſcurvy or the cauſes of ſcurvy, both diet and internal medicine ſeem to be of little ſervice, and the cure reſts entirely on the diſſipation of infectious effluvia, or the removal from it, and upon local treatment, which is the only part of the ſubject now to be conſidered.

I ſhall therefore enumerate the external applications which have been recommended by the beſt modern practitioners, and

and which have been found moſt ſucceſsful in the navy. In doing this, I ſhall follow Mr. Home's method of claſſing them into thoſe in the form of vapour, thoſe in a fluid form or moiſt ſtate, thoſe in the form of powder, and thoſe in the form of ointment. Laſtly, the method of cure by mechanical compreſſion will be adverted to.

It is proper to premiſe, that Mr. Home claſſes ulcers into thoſe in which the action of the parts are too violent, thoſe which have an acquired irritability, and thoſe attended with indolence, and refers ſcorbutic ulcers to the laſt. Theſe cannot be ſaid to be indolent, according to the ſtrict import of the word, ſince they are attended with great pain; but the epithet is ſufficiently proper, in ſo far as thoſe ulcers are obſtinate and ſtationary, and require ſtrong *ſtimuli* to excite in them an healthy action, by producing good granulations, while mild and ſoothing applications are of no ſervice, or even aggravate the ſymptoms. This obſervation is made both by Mr. Home, and by the navy ſurgeons, particularly by Dr. Pattiſon, who has for the laſt two years had the charge of the naval hoſpital at the Cape of Good Hope.

1. The

1. The applications in the form of vapour are fomentations, or the nitrous vapour. The former conſiſt either of plain water, or the decoction of certain herbs, ſuch as chamomile, ſouthernwood, wormwood, laurel leaves, or * hops. Though theſe ulcers are denominated indolent, they are ſometimes in a temporary ſtate of irritability, as in their recent and ſpreading ſtate, or when they have ſuffered any accidental irritation from fatigue or otherwiſe. On ſuch occaſions fomentations are proper; and when the pain is great, a decoction of poppy heads, mixed with an equal proportion of proof ſpirit, is often of ſervice.

I was extremely ſanguine, in thinking that the nitrous vapour, which was introduced into uſe by Dr. Carmichael Smyth, as a deſtroyer of infection, would be uſeful in deſtroying this infection; but though it was found to remove the fœtor, it does not appear to have had any effect in extinguiſhing the infection itſelf. A very fair trial of it was made in the Triumph, but without ef-

* The hops, employed as a cataplaſm, have been found of ſervice at Plymouth hoſpital.

fect.

fect. It was next thought of as an immediate application to ulcers; and Mr. David Paterſon, ſurgeon to priſoners of war at Forton, tranſmitted an account of the trials he had made with this view, which were ſo much in its favour, that it was printed and diſtributed in the ſhips and hoſpitals. The majority of the trials that were made in conſequence of this, did not confirm what was alledged by Mr. Paterſon; who might naturally enough aſcribe to this cauſe effects which were in great meaſure owing to the diet, air, and general good treatment, which could not fail to have a beneficial influence on men who had been long at ſea, or from a warm climate. I am inclined, however, to think, that the bad effects remarked by ſome ſurgeons, might be owing to its being applied in a ſtate too acrimonious and concentrated, and that a more mild and judicious uſe of it may ſtill be found uſeful in certain ſituations.

2. Under the head of applications in a watry ſtate, are comprehended poultices. Theſe being only as it were a more continued fomentation, are proper only in the caſes where fomentations were ſaid to be uſeful;

uſeful; and may be made of the ſame fluids along with oatmeal. Theſe applications are ſoothing and defenſive, and imbibe the ichorous diſcharge which would otherwiſe irritate the neighbouring parts. It is found abſolutely neceſſary in warm climates to renew them twice a day, when the diſcharge is copious and putrid. Caſſada, linſeed meal, raw potatoes, carrots, and turnips, have all been found uſeful materials for poultices. Oatmeal, in a ſtate of beginning acidity, or mixed with the grounds of beer, has been found ſerviceable in taking off fœtor, and diſpoſing ulcers to heal.

Warm applications have been found to be hurtful in the acute and gangrenous ſtate of ulcers, according to the teſtimony of ſeveral of the ſurgeons of the ſhips and hoſpitals. Mr. Home is alſo of this opinion. They were therefore applied cold, either plain or ſprinkled with ſaturnine ſolutions, or vinegar and water, or lemon juice, which has been found ſuperior to moſt other detergents in this ſpecies of ulcers, particularly in tropical climates. Saturnine applications are not ſo well adapted to this, as to ſome other ſort of ulcers, and are

are beſides apt to produce the lead cholic *. Mr. Home adviſes to lay aſide poultices, when granulations begin to form.

A very dilute ſolution of the *argentum nitratum*, or lunar cauſtic, has been found uſeful in modern practice as a detergent in ulcers of this kind. There are ſome caſes, in which a ſimilar ſolution of *cupprum vitriolatum* is ſerviceable.

The *ſuccus gaſtricus* of cattle, was found of great ſervice by * Dr. Harneſs, phyſician to the fleet in the Mediterranean. It is not favourably ſpoken of by thoſe who have made trial of it in other parts of the

* The following is an extract of a letter from Dr. Pattiſon, dated Cape of Good Hope, 1ſt July 1797. " Red precipitate to be uſed twice a-day, until the putrid ſloughs have caſt off. A compreſs of linen, wet " with vitriolic or camphorated ſaturnine water to be " applied, properly ſupported by a flannel roller. When " the ulcer is clean, and the diſcharge good, dry lint may " be uſed, or now and then moiſtened in lime juice. " Slips of cerate to be applied round the edges. The " compreſs to be wet three times a-day, and the roller " to be ſoaked in *acetum camphoratum*, before it is ap- " plied."

* See Tranſactions of a Society for the Improvement of Medical and Chirurgical Knowledge, Vol. II.

world.

world. They alledge it is too ſtimulant. But Mr. Home has experienced the moſt unequivocal good effects from it at St. George's hoſpital, and it ſeems deſerving of further trials in the navy.

Tincture of myrrh is recommended as an application to ulcers of this kind, by ſome of the moſt experienced practitioners.

Mr. Home mentions, on his own experience, the nitrous acid diluted, ſo as to fit it for an external application, as a very uſeful medicine. The ſenſible effect of it is to coagulate the *pus*, and form a cruſt, under which the granulations are formed. It does not anſwer when the ulcer is in an irritable ſtate, as it then aggravates it and makes it ſpread.

In ſo far as I know, this practice is not known in the navy, but is certainly deſerving of a trial. While I was phyſician to St. Thomas hoſpital, it was found that the muriatic acid uſed in this manner to cancers, took off entirely the fœtor ſo offenſive to the patient, and thoſe in the ſame apartment, and retarded the progreſs of the complaint,

complaint, but it was not found to have this effect in foul ulcers of a different kind.

The purpoſe of ſpecifying ſo great a variety of applications under this and other heads, conſiſts not only in ſuggeſting applications ſuited to the varieties of conſtitutions and caſes, but in affording a ſucceſſion of them; for it is found, that any one application loſes its effect by its uſe being long continued.

3. The third form of application is that of powders. Several ſurgeons of the fleet, as well as Mr. Home, have found great advantage from charcoal in this form. Extract of opium, mixed with an equal quantity of ſome other powder, ſuch as linſeed meal, has been found to have a good effect in certain ulcers. Rhubarb *, in the ſame form, is very favourably ſpoken of by ſeveral ſurgeons of the fleet. Peruvian bark

* This was firſt propoſed by Mr. Home, in a paper in the firſt volume of Tranſactions of a Society for the Improvement of Medical and Chirurgical Knowledge. Vol. I. London 1793.

has

has been used with success in the same manner.

But the application in this form, which has been found by far the most useful in foul ulcers, even in their acute and spreading state, is the red precipitate, or *hydrargirus nitratus ruber*. Mr. Home recommends that it be only occasionally applied, unless it is rendered less active by being intimately mixed in different proportions with some inert powders *.

4. The next form of application is that of ointment. Mr. Home thinks unctuous applications better adapted to this species of ulcer than any other. They require the addition of some stimulating ingredient, such as the salts of mercury. The *ungentum hydrargyri nitrati* mixed with the *adeps suilla* in different proportions, is one of the best applications, and Mr. Home thinks it has more power in producing healthy granulations, and in removing the thickened

* I do not find that the *ærugo æris* has been tried in these ulcers. As it is a powerful detergent and escharotic, of long established character, it seems to be deserving of a trial.

edges of ulcers, than any other applications.

The ointments are themſelves ſometimes compoſed of acrid ingredients, ſuch as the *reſina flava* or gum elemi, or they are mixed with the red precipitate in the proportion of a drachm to an ounce, more or leſs according to circumſtances.

Camphor, mixed with the *unguentum album*, anſwers in ſome varieties of this ulcer.

Mr. Brown of the Royal Sovereign found advantage in ſome foul ulcers from an ointment compoſed of two ſcruples of calomel, and one ounce of *unguentum picis*.

5. The laſt mode of external treatment is that by mechanical compreſſion. Rollers, tight bandages, and laced ſtockings, have long been in uſe as good auxiliaries in the cure of obſtinate ulcers; but there is a method of cure upon this principle lately thought of by Mr. Bainton of Briſtol, which has been found far ſuperior to any other upon this or any other principle.

The

The mode of executing it is tranſcribed * below from the ſecond edition of Mr. Bainton's publication, a work with which every practical ſurgeon ſhould be provided.

It

* "The parts ſhould be firſt cleared of the hair ſometimes found in conſiderable quantity on the legs, by means of a razor, that none of the diſcharges, by being retained, may become acrid and inflame the ſkin, and that the dreſſings may be removed with eaſe at each time of their renewal, which in ſome caſes, where the diſcharges are very profuſe, and the ulcers very irritable, may perhaps be neceſſary twice in the twenty-four hours, but which I have in every inſtance been under the neceſſity of performing only once in that ſpace of time.

"The plaiſter ſhould be prepared by ſlowly melting in an iron ladle a ſufficient quantity of litharge plaiſter or diachylon, which if too brittle when cold to adhere, may be rendered adheſive, by melting half a drachm of roſin with every ounce of the plaiſter. When melted, it ſhould be ſtirred till it begins to cool, and then ſpread thinly upon ſlips of ſmooth porous calico of a convenient length and breadth, by ſweeping it quickly from the end held by the left hand of the perſon who ſpreads it, to the other held firmly by another perſon, with the common elaſtic ſpatula uſed by apothecaries. The uneven edges muſt be taken off, and the pieces cut into ſlips about two inches in breadth, and of a length that will, after being paſſed round the limb, leave an end of about four or five inches. The middle of the piece ſo prepared, is to be applied to the ſound part of the limb oppoſite the inferior part of the ulcer, ſo that the lower edge of the plaiſter may be placed about an inch below the lower

It is conſidered as a very judicious and ingenious practice, and extenſive experience has already aſcertained the great utility of

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edge of the ſore, and the ends drawn over the ulcer with as much gradual extenſion as the patient can well bear. Other ſlips are to be ſecured in the ſame way, each above and in contact with the other, until the whole ſurface of the ſore and the limb are completely covered at leaſt one inch below, and two or three above the diſeaſed part.

"The whole of the leg ſhould then be equally defended with pieces of ſoft calico three or four times doubled, and a bandage of the ſame about three inches in breadth, and four or five yards in length, or rather as much as will be ſufficient to ſupport the limb from the toes to the knee, ſhould be applied as ſmoothly as can be poſſibly performed by the ſurgeon, and with as much firmneſs as can be borne by the patient, being paſſed firſt round the leg at the ankle joint, then as many times round the foot as will cover and ſupport every part of it except the toes, and afterwards up the limb till it reaches the knee, obſerving, that each turn of the bandage ſhould have its lower edge ſo placed as to be an inch above the lower edge of the fold next below. If the parts be much inflamed, or the diſcharges very profuſe, they ſhould be well moiſtened and kept cool with cold ſpring water poured upon them, as often as the heat may indicate to be neceſſary, or perhaps at leaſt once every hour. The patient may take what exerciſe he pleaſes, and it will be always found that an alleviation of his pain, and the promotion of his cure, will follow as its conſequence, though under other modes of treating the diſeaſe it aggravates the pain and prevents the cure."

it.

it. It does not anſwer in the recent inflammatory and ſpreading ſtate of ſcorbutic and infectious ulcers, nor in venereal, carious, nor cancerous caſes. But in other caſes there are ample teſtimonies of its ſucceſs, from ſome of the moſt reputable * ſurgeons of the fleet, and from the ſurgeons of the hoſpitals at Plymouth and Norman Croſs, and it is a method daily gaining ground both in public and private practice.

There are two remedies which are not referrible to any of the claſſes above mentioned, the cold bath, and change of climate. The firſt has been found of ſenſible benefit in the opinion of ſeveral medical men of accurate obſervation. With regard to

* Mr. Brodie of the Atlas, Mr. Brown of the Royal George and Royal Sovereign, Mr. Jarvis of the Culloden, Mr. Magrath of the Ruſſel, Mr. Fuge of Plymouth hoſpital, and Mr. Magennis, ſurgeon to priſoners of war at Norman Croſs, all concur in recommending this practice from their own experience. The laſt mentioned gentleman communicated to the Medical Board of the navy ſuch a clear and ſatisfactory account of its ſucceſs, that they cauſed it to be printed, and tranſmitted copies of it to all the naval hoſpitals and ſhips in commiſſion, in order to diffuſe the knowledge of this excellent practice.

change of climate, though we have ſeen the malignant ulcers prevail in ſhips which never had been in a hot climate from their being commiſſioned, and although the ulcers have prevailed in them with equal malignity in the winter ſeaſon, it is nevertheleſs true, that the bad ulcers which broke out in the Weſt Indies are greatly benefited by a change to a temperate climate.

CHAP. V.

Of various CASUALTIES: DROWNING—SUFFOCATION — POISON — INTOXICATION—COLD—BURNS, &c.

EVERY humane and conſcientious member of the medical profeſſion, will feel it as a matter of duty to furniſh himſelf with the knowledge requiſite for counteracting theſe accidents, and to carry conſtantly in his mind the methods of giving relief in caſes which do not admit of long deliberation, nor of employing much time in conſulting authors, or procuring the aſſiſtance of farther advice.

As moſt of theſe accidents are uncommonly incident to a ſea life, a conciſe account of the moſt approved means of counteracting them, will, I apprehend be conſidered, as a proper article of this work.

1. Accidental ſubmerſion in cold water is the moſt frequent of theſe, and the firſt

object in ſuch caſes is to reſtore warmth. With a view to this the body ſhould, without the leaſt loſs of time, be ſtripped and thoroughly dried, by rubbing it with hot cloths. In caſe the ſun ſhould be ſhining, and the climate and ſeaſon will admit of it, the body may be expoſed to the rays of the ſun, as theſe will communicate a proper degree of warmth, and the expoſure to the freſh air will be favourable to the return of reſpiration. If the weather ſhould not allow of this, the drowned perſon ſhould be carried into a well-aired apartment, where warmth ſhould be applied to the ſkin by cloths heated at a fire; hot bricks or bottles filled with hot water, and wrapped in a cloth, applied to the feet; hot ſalt in a bag, applied to the pit of the ſtomach; by a warm bath, or by the living body being applied to it, taking care however, that the air of the apartment be cool and pure, by the admiſſion of freſh air, and the removal of all perſons who are not neceſſary in the operations for reſtoring life.

It is almoſt needleſs to caution the reader againſt carrying to exceſs certain pernicious practices,

practices, founded on the opinion that the ſole cauſe of death conſiſts in water being taken into the body, either by the ſtomach or lungs. This conſideration, however, is not entirely to be overlooked, for it has been found by* experiments with tinged liquors, that ſome part of the fluid medium gets into the lungs, and it is perhaps owing to this that ſubmerſion deſtroys life in a ſhorter time than ſtrangulation, as I have aſcertained by experiment. It will be proper at any rate, as ſoon after the accident as poſſible, to put the body for a ſhort time in ſuch a poſition that the water may drain, if not from the lungs at leaſt from the *fauces*, in order that it may not embaraſs reſpiration in caſe it ſhould return.

It is almoſt equally needleſs to inform the regular practitioner, that the ſuſpenſion or extinction of life depends on the inhalation of vital air being interrupted by the ſubmerſion, and that all the means of recovery ought to have in view the reſtoration of reſpiration. Vital air, in contact with the air veſſels of the lungs, being that † ſpecific

* See a work entitled Connection of Life with Reſpiration, by Dr. Goodwin.

† See Lecture of Muſcular Motion, page 19.

ſtimulus

ſtimulus upon which the action of the heart depends. For this purpoſe the body ſhould be raiſed nearly to the ſitting poſture, and every effort made, as ſoon as poſſible, to bring the organs of reſpiration into play. This poſture will be moſt favourable, by taking off the preſſure of the inteſtines, which form an obſtacle to the deſcent of the diaphragm, in which conſiſts the principal action of life in performing inſpiration. A ſtate of death, whether real or apparent, is a ſtate of expiration, and our endeavours to reſtore life ſhould therefore, in the firſt inſtance, be directed to enlarge the cavity of the thorax, as this conſtitutes inſpiration. Beſides favouring the deſcent of the diaphragm therefore, an attempt ſhould be made to imitate the rotation of the ribs, by ſtroking them with conſiderable preſſure upward and a little forwards. In experiments upon animals, I found this operation conduce more than any other to the reſtoration of life; and this might be expected, as it is the only one which imitates Nature's method of performing reſpiration. The advantage gained by the erect poſture is confined to the human ſpecies, this being the poſture natural and

and peculiar to man. The actions of reſpiration will farther be favoured by alternate preſſure on the ſternum and abdomen, the compreſſion of the abdominal *viſcera* by the muſcles of the *parietes*, being the principal means of expiration in the ordinary actions of life.

In aid of theſe operations the expanſion of the thorax ſhould alſo be attempted, by endeavouring to inflate the lungs by the noſe. The air from the lungs of another perſon is neither ſo cool nor ſo pure as could be wiſhed, but the efficacy of this operation is undeniable, from the frequent well atteſted recoveries of children, apparently dead immediately after birth, by this method; and as it is the moſt eaſily and quickly performed, it ſhould be put in practice till an artificial apparatus for this purpoſe can be procured. The air by this method ſhould alſo be introduced by the noſe, as it will thus paſs more readily behind the epiglottis than by the mouth.

In inflating the lungs, care ſhould be taken to preſs the larynx backwards, in order to prevent the air from paſſing into the ſtomach by the gullet.

Among the ſecondary methods of reſtoring animation may be reckoned agitation, friction, and change of poſture. The friction ſhould be performed with hot dry cloths. Dr. Cullen recommends the ſpirit of ſal ammoniac to be rubbed on the wriſt and ankles, and the ſkin to be rubbed with hot ſpirits. Theſe, however, ſhould be practiſed with diſcretion, for nothing is more likely to deſtroy the faint remains of animation than mechanical means too roughly employed. Life has been aptly compared to a * flame. The ſame means, which, when employed in a moderate degree, are well calculated to excite it, will, if violently employed, extinguiſh it.

Theſe, and other means of recovery, ſeem to operate by their action on reſpiration, for all functions and actions are dependent upon each other, and have therefore a mutual influence both in ſuſpending and exciting each others motions. With this view the play of the ſtomach and bowels ſhould, if poſſible, be reſtored. Glyſters have been recommended, with a view to excite the na-

* Nutritur vento, vento reſtinguitur ignis,
Lenis alit flammas, grandior aura necat.

tural

tural action of the bowels. Tobacco ſmoke was firſt recommended for this purpoſe, and there are ſtrong teſtimonies in its favour in the caſes publiſhed in Holland illuſtrative of this ſubject. This may probably act by ſimple diſtenſion; and there is a caſe on record where merely filling the * inteſtines with air from a common bellows, ſeemed almoſt inſtantly to reſtore life in a drowned child. Later writers have exploded the uſe of tobacco, alleging, that it is a narcotic, and therefore unfriendly to life, and propoſe inſtead of it to inject warm wine or diluted ſpirits, with ſomething nouriſhing. The ſmoke of aromatic herbs or gums ſeem leſs exceptionable than that of tobacco. The liquid injections have alſo the advantage of being more eaſily and ſooner procurable; but there are ſo many teſtimonies in favour of the ſmoke glyſters, that they ſhould not be haſtily laid aſide merely upon reaſoning, and they are not incompatible with the others.

In caſe the power of ſwallowing ſhall have returned, no time ſhould be loſt in in-

* See Collection of Authentic Caſes, &c. by Alexander Johnſon, M. D. London 1773.

troducing

troducing ſomething cordial, ſuch as warm wine, or diluted volatile alkali into the ſtomach. It becomes a queſtion whether an emetic ſhould be employed. In caſe the accident ſhould have happened after a full meal, it ſeems proper to excite vomiting, for it is found that a large quantity of undigeſted victuals proves a great embarraſſment to the functions of life in general, as exceſs of eating or indigeſtion, are apt to excite fits of the aſthma and apoplexy. If it ſhall appear alſo from the external tumefaction of the ſtomach, that a large quantity of water has been ſwallowed, the ſame ſteps will be adviſeable, for any thing bulky in the cavity of the abdomen, will neceſſarily obſtruct the deſcent of the diaphragm, which, as has been ſaid, is the principal action of reſpiration. The argument employed againſt emetics, is, that every evacuation and unneceſſary exertion being lowering to the powers of life, ſhould be avoided. But if white vitriol is employed this objection will not apply, for it not only operates ſpeedily but eaſily, with little nauſea, and this metallic ſalt has a tonic power. Half a drachm of it diſſolved in two ounces of water will be a proper doſe.

The

The queſtion reſpecting the propriety of blood-letting after accidents of this kind, ſeems to admit likewiſe of a qualified anſwer. Some late writers have condemned this practice in all caſes. But their ideas on this and other points are deduced from theory; and though it ſeems highly rational to affirm, that the abſtraction of blood being a means of weakening the powers of life, is a very unlikely means of reſtoring it, yet it has certainly been practiſed in ſome of the moſt ſucceſsful inſtances of reſuſcitation; and in plethoric and fat ſubjects, it ſeems a very likely means of giving greater freedom to the ſtagnated circulation. If the face is livid, Dr. Cullen adviſes the opening of the jugular vein.

On the principle already mentioned, of the mutual influence of all the parts and functions, the ſenſibility and irritability of every portion of the body that can be come at, ſhould be gently rouſed. Not only the ſkin therefore, and the bowels, but the Schneiderian membrane, having a natural ſympathy with the organs of reſpiration, ſhould be ſtimulated, either with a feather or the vapour of the volatile alkali; and there can be

be no doubt, but if ſome warm cordial could be introduced into the ſtomach before the power of ſwallowing is recovered, by means of a flexible tube *, it would have an important effect in reſtoring the powers of life.

It is the advice of † Mr. John Hunter, that when reſpiration begins to return, the means uſed for its reſtoration ſhould be ſlackened, for fear of overpowering the firſt and feeble actions of life; and the like caution with regard to warmth, food, and cordials, ſeem adviſeable during the progreſs of recovery.

2. Next to drowning, the moſt common accident peculiar to a life at ſea is the ſuffocation from foul air in the hold of a ſhip.

The ſymptoms of this accident are conſiderably different from thoſe attending ſubmerſion in cold water. 1ſt. There are

* A contrivance of this kind is deſcribed by Mr. J. Hunter, in the firſt volume of Tranſactions of a Society for the Improvement of Medical and Chirurgical Knowledge.

† See Philoſophical Tranſactions, vol. 69.

caſes

caſes which prove fatal, in which though conſciouſneſs is loſt, reſpiration is not ſtopped, as * I myſelf have witneſſed. 2dly. So far from the body being cold, there is a preternatural degree of heat, where the accident is recent. 3dly. There is a turgeſcence both of the internal and external veſſels of the head.

When an accident of this kind is recent, more eſpecially when reſpiration has not ceaſed, the external application of cold water has been found of the utmoſt benefit. There is a great number of well-authenticated caſes on record in proof of this. It may be daſhed upon the face, and even upon the whole body. Dr. Gutherie † relates, that accidents of this kind are frequent in

* This happened in a ſhip in the Weſt Indies, on board of which I was at that time on ſome other profeſſional duty. Four men were rendered inſenſible in going down to the well. Two ſoon recovered. The other two died. They continued to breath till death, in the manner of a perſon in apoplexy. I look back with compunction at not having then in my recollection the moſt effectual means of reſtoring them, particularly the external application of cool air and cold water; and I make this confeſſion as a warning to others, that they may be prepared for ſuch emergencies.

† Philoſoph. Tranſactions, vol. LXIX.

Ruſſia, in conſequence of their mode of life, and that ſuch caſes are ſucceſsfully treated by expoſing the body almoſt naked to the open air in ſnow.

Strong ſtimuli ſhould be avoided*. Vinegar ſhould be applied to the noſtrils, and vinegar, diluted with water, ſhould be given by the mouth.

In conſequence of the increaſe of heat, the additional force of the circulation, and the congeſtion in the head, the taking of blood from the head is indicated. This is done either by cupping or by opening the temporal artery, or jugular vein.

In caſes where the accident is not ſo recent, ſo that reſpiration has ceaſed, and the body is below its natural temperature, the ſame means of reſuſcitation as thoſe deſcribed in caſes of drowning, are to be practiſed.

The opening of the trachea by inciſion, whereby to inflate the lungs, has been recommended in caſes of ſuſpended reſpiration, from whatever cauſe. There is a well

* See Portal on Recovery from Apparent Death.

authenticated

authenticated * caſe of a man reſtored to life chiefly by this means, after being ſuſpended in the execution of juſtice for twenty-nine minutes.

It ſometimes happens that inſenſibility and apparent death is brought on by a blow or concuſſion, though no particular organ is materially injured. This is moſt likely to happen from a blow on the ſtomach. The uſe of the warm bath in ſuch caſes is perhaps one of the beſt means of recovery. A caſe † ſtrongly in ſupport of this is related by Dr. Alexander. A man received a blow on the breaſt, by which he was not only rendered inſenſible, but his breathing ceaſed. A vein was opened, which did not bleed; but ſoon after he was put into a warm bath, reſpiration began to return, blood flowed freely from the vein, and he ſoon entirely recovered.

There is an injury incident to ſeamen in battle, called the wind of a ball, more particularly to be deſcribed hereafter, which

* See Collection of Authentic Caſes before cited.

† Phyſical and Literary Eſſays, vol. III. Edinburgh, 1771.

ſometimes inſtantaneouſly deſtroys life, without any apparent leſion of parts. The means laſt mentioned might be employed with a probability of ſucceſs.

It is not uncommon for ſhips to be ſtruck with lightning; and as the effect of it upon the animal frame is to produce palſy and coldneſs, cordials and ſtimulants, particularly external warmth, are indicated, together with the means for reſtoring reſpiration. The warm bath would probably be found beneficial. Bleeding and other means of lowering the patient ſhould be avoided *.

3. Accidents from † poiſon ſometimes happen on board of ſhips. Moſt of the

* In the ſpring of the year 1798, this accident happened on board of the Cambrian frigate. Two men were killed, and one apparently ſo, being deprived of conſciouſneſs and reſpiration. Friction and external warmth ſeemed to have the principal ſhare in his recovery, which however was only partial, for in a year afterwards he had not recovered his ſpeech, nor his natural ſtrength. Several other men were ſtruck, but leſs violently, having been affected with palſy in ſome of the extremities, from which they in time recovered.

† See page 293.

mineral

mineral poiſons, ſuch as verdigreaſe and corroſive ſublimate, being metallic ſalts, are decompoſable by fixed alkalis. Theſe ſhould be adminiſtered in a very diluted ſtate along with ſweet oil, broth, or milk. Hepar ſulphuris diſſolved in water, in the proportion of a drachm to a pint, is recommended by the French authors. Calcined magneſia, being free from acrimony, and being alſo purgative, is preferred in ſome caſes to the alkalies.

Where mineral acids have been ſwallowed, the propriety of applying the ſame remedies is ſtill more obvious.

The firſt and moſt obvious means of counteracting all poiſons is by evacuating them by vomiting. The moſt ſpeedy emetic is white vitriol, which may be given to the quantity of a drachm diſſolved in a cup of warm water. In caſe this or any of the common emetics ſhould not be immediately procurable, a ſmall quantity of ſnuff, which can almoſt always be inſtantly procured, may be ſwallowed. In caſe the opportunity of evacuating them by vomit ſhould be loſt, an attempt ſhould be made to expel them downwards. The purgatives that ſeem beſt

adapted for this are caſtor oil, and a ſolution of purging ſalts.

Where the power of deglutition is deſtroyed, vomiting may be excited by a cataplaſm of tobacco to the pit of the ſtomach.

Thoſe acrimonious poiſons which act only on the living fibre, ſuch as cantharides, are to be counteracted chiefly by milk and oil.

In thoſe caſes in which unctuous ſubſtances are adviſeable, mutton ſuet, melted with a gentle fire, has been thought to anſwer better than oil.

The narcotic poiſons are ſaid, by ſome authors of reputation, to be beſt counteracted by vegetable acids.

Opium is ſometimes taken ſecretly with a view to deſtroy life. A viſible throbbing of the carotid arteries is a diſtinguiſhing ſymptom of this poiſon, and I once detected it by this criterion. After death has from this cauſe apparently taken place by a ceſſation of reſpiration, life has been known to

be reſtored by blowing ſtrongly into the lungs with a bellows. It is therefore worth while in all caſes to attempt this, by means ſimilar to thoſe deſcribed in accidents by ſuffocation.

Under this head intoxication may be included, ardent ſpirits being a narcotic poiſon, and very fatal accidents from it are frequently related in the journals of navy ſurgeons. The ſame means therefore are to be uſed even after the apparent ceſſation of life.

In thoſe caſes of * poiſon ſuddenly affecting life, ſuch as the bites of animals, and thoſe uſed for poiſoning weapons, the pure volatile alkali, either in the form of *aqua ammonia pura*, or *eau de luce*, has been found to have conſiderable reviving powers. A teaſpoonful of theſe may be given repeatedly in water.

4. Accidents from cold may be enumerated among thoſe incident to a ſea life. In caſes of froſtbitten limbs, it is a precaution, the propriety of which is well eſta-

* See Aſiatic Reſearches, vol. II. p. 323.

bliſhed and generally known, that the part ſhould not be ſuddenly expoſed to heat, as this would infallibly bring on ſudden mortification. This is ſo well known even to the vulgar in countries ſubject to this accident, that the firſt ſtep taken gradually to reſtore warmth is to rub the part affected with ſnow.

Upon the ſame principle, when the whole body has been long expoſed to intenſe cold, as in caſes of ſhipwreck, the ſudden expoſure to heat, the immediate adminiſtration of ſtrong cordials, and rich nouriſhment, ſhould be avoided. All theſe means of reſtoration ſhould be uſed in a moderate degree, and in a gradual manner. In applying external warmth it will be found, that much more comfort will be derived from ſuch application being made to the pit of the ſtomach, than to any other part of the body.

It is of the utmoſt conſequence, that a ſurgeon of the navy ſhould make himſelf maſter of the moſt approved method of treating caſualties from burning. It appears from the medical journals, that ſcalds are very common accidents, but ſcorches from gunpowder

powder are peculiarly incident to this ſervice, and are productive of extreme ſuffering, long confinement, and great danger.

With regard to ſcalds, the uſe of vinegar was recommended in a publication ſome years ago by a brewer in Edinburgh, and very ſatisfactory evidence brought of its good effects, from his experience in the application of it to his workmen, who frequently met with theſe accidents, and the utility of it has been confirmed by profeſſional practice. The part may be immerſed in the vinegar, or covered with rags kept conſtantly wet with it.

In burns, the application beſt eſtabliſhed by experience, ſo far as I know, is equal parts of linſeed oil and lime water. At the furnaces of the Carron iron work, this remedy has been for many years preferred to all others.

In all caſes of burns, whether from hot liquids or ignited bodies, ice and iced water has of late been uſed with great ſucceſs in private practice in London. It not only prevents the ſevere ſuffering incident to recent accidents of that kind, but prevents veſications,

veſications, thoſe tedious and painful ulcerations which uſually follow injuries from fire.

Preparations of lead have alſo been found of great uſe in ſuch caſes, in their recent ſtate, but they ſhould not be long continued.

CHAP. VI.

Of the WOUNDS received in the Actions of April 1782.

Loſs in the Battle and from Wounds—Fatality of the locked Jaw—Treatment of it—Some Ships more ſubject to it than others—Different from other Caſes of Tetanus—It is not cured by the Removal of the Part—It may come on after the Part is cured—Effect of Climate in producing it—Accidents from the Wind of a Ball—Accidents from the Exploſion of Gunpowder—Means of preventing them—General Obſervations on Sores and Wounds.

THOUGH ſurgery was not properly in my department, yet having had a fair opportunity of collecting facts concerning this branch of practice, I thought it my duty to pay ſome attention to it.

The whole number of men wounded in the actions of April, 1782, amounted to eight hundred and ten.

Of

Of theſe, ſixty died on board before the end of the month, five in the courſe of the following month, and two in June.

There were ninety-ſeven wounded men ſent to the hoſpital at Port Royal, of whom there had died twenty-one when the fleet left Jamaica on the 17th of July.

So that the whole loſs of men in the battles of April, and their conſequences, is as follows:

Killed outright - - - - - -	266
Died of their wounds on board - -	67
Died of their wounds at the hoſpital	21
Total	354

Of thoſe who died on board, fifteen were carried off with the ſymptoms of the locked jaw; but of thoſe ſent to the hoſpital, only one. The reaſon that ſo few in proportion were affected with it in the hoſpital may have been, that none of the wounded were landed till near the end of the third week after the principal action. The danger of this ſymptom was then, in a great meaſure, paſt,

paſt, though I have known it to take place in every period from the ſecond or third day till the fourth week.

Only three men in the whole fleet recovered from this alarming complaint; and as it is intereſting to know every thing relating to ſo deſperate a ſymptom, I ſhall give a ſhort account of each.

The firſt was a ſeaman of the Montagu, who had his thigh wounded by a ſplinter, which carried away part of the integuments and *membrana adipoſa*, and lacerated in a ſmall degree the *vaſtus externus* muſcle. The wound did extremely well till the 23d day, when the jaw became almoſt entirely fixed, and the whole muſcles of the wounded ſide were thrown into frequent ſpaſms. Mr. Young, the ſurgeon, who was always anxious and aſſiduous in his duty, conſulted with me, and we had immediate recourſe to the warm bath, which gave a degree of inſtantaneous relief, and was repeated twice a day for half an hour. He was ſenſibly better every time; in nine days was entirely free of the ſymptom, and continued afterwards to do well. The only other means taken for this man's recovery,

recovery, beſides what were uſed with the other wounded men, were from three to five grains of opium, which he took every day, in divided doſes.

The next was a ſeaman of thirty years of age, belonging to the Magnificent, who had the *humerus* broken and ſhattered by a ſplinter which entered the deltoid muſcle. Several large portions of bone were extracted, and the artery was laid bare on the inſide. On the fifth day there came on a large ſanious diſcharge, with a low quick pulſe and depreſſed ſpirits, and the jaws began to cloſe, with pain and ſtricture on both ſides about the articulation of the lower jaw. He had every day ſince the accident taken half an ounce of Peruvian bark, combined with opium or rhubarb, according as it made him looſe or coſtive. This was continued, and the part externally was kept conſtantly moiſt all round with volatile liniment, to which a fourth part of *tinctura thebaica* was added. Next day the jaw was almoſt entirely fixed, ſo that it was with difficulty that a little wine and water could be introduced with a ſpoon. Mr. Harris, the ſurgeon, now wiſely determining to do ſomething vigorous in this

this unpromiſing ſituation, beat up twelve ounces of opium moiſtened to the conſiſtence of a cataplaſm with the thebaic tincture, and applied one half to each ſide of the jaw. The patient this day ſwallowed a pint of the bark decoction with half an ounce of nitre, and took a diaphoretic draught of twenty drops of thebaic tincture and thirty of antimonial wine. He had alſo the ſmoke of tobacco thrown up his noſtrils.

On the third day after the attack he could open his mouth half an inch. The cataplaſms were taken off, beat up afreſh with the tincture, and applied anew. The bark and other medicines were continued. On the fourth day the ſtricture and pain of the jaw went entirely off, but the cataplaſm and volatile liniment were applied for three days longer. The wound produced a laudable diſcharge, every ſymptom became favourable, and he continued to recover.

The only other perſon who recovered from this ſymptom was a man in the Bedford. Several died of it on board of this ſhip; and

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as the ſame means of relief were ſkilfully employed in all the caſes by Mr. Wickes, the ſurgeon, the ſucceſs ſeemed owing more to ſomething favourable in the man's conſtitution, than any thing peculiar in the treatment, which conſiſted in the adminiſtration of the warm bath, opium and camphor, with mercurial friction on the jaw.

This accident affected ſome ſhips remarkably more than others, particularly the Barfleur and Bedford, though their wounds had nothing peculiar, nor were in a greater proportion than in the reſt of the fleet. Four were carried off by it in each of theſe ſhips. It has formerly been obſerved, that great ſhips acquire peculiar habits, or diſpoſitions, which incline the conſtitutions of the men to one diſeaſe more than another. This complaint took a run in ſome particular ſhips alſo after the battle of the Cheſapeak in autumn 1781; and I have known it prevail in ſome particular hoſpitals more than others. In the preſent inſtance, it may have been owing either to ſomething peculiar in the conſtitution, or air of the ſhips; or we can conceive it to be owing to nervous ſympathy,

ſympathy, juſt as the *epilepſy** has been known to ſpread from one boy to another, at a ſchool, in conſequence of imitation, dread, horror, or ſome ſuch delicate nervous or mental affection. We have in yawning an example of a ſpaſmodic affection ſpreading from one perſon to another. If this is the caſe in the locked jaw, thoſe affected by it ſhould be removed from the preſence of the other wounded men, leſt the idea of the ſufferings of others ſhould be ſo fixed in their mind, or ſo impreſs them with the fear of the like, as to invite the attack of the ſame complaint.

Though the locked jaw, in conſequence of wounds, reſembles frequently in its ſymptoms the tetanus which ariſes without any external accident, yet there are many caſes of the former which differ materially from the violent ſymptoms of the other, as de-

* See Kaau Boerhaave's account of this epilepſy in a ſchool at Harlaem, in a book entitled, Impetum faciens, dictum Hippocrate per corpus conſentiens (page 355.) A fact of the ſame kind is alſo related in a pamphlet, entitled, Rapport des Commiſſaires chargés par le Roi de l'examen du Magnetiſme Animal. Paris 1783.

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ſcribed by authors. In moſt caſes of the locked jaw from wounds the ſpaſms are not ſo general, ſo violent, nor attended with ſuch exquiſite pain. It ſometimes happens that the convulſive twitchings are even accompanied with a ſort of pleaſure, as in the caſe of a lieutenant of the Montagu, whoſe caſe was related to me by Mr. Young, the ſurgeon of that ſhip, upon whoſe fidelity and accuracy I could perfectly rely. This officer had been wounded in the elbow at the battle of St. Chriſtopher's by a ſplinter, whereby the capſular ligament of the joint was injured. On the ninth day, ſymptoms of the locked jaw came on, and ſoon after the whole muſcles of the wounded ſide were affected with frequent convulſive twitchings, which, as he himſelf ſaid, afforded a pleaſant ſenſation, exciting laughing like an agreeable titillation. He died on the fourth day after it came on, and had no pain to the laſt.

It is to be remarked, that the locked jaw did not take place in thoſe caſes in which the wounds had a foul and gangrenous appearance more than others; for thoſe that digeſted and cicatrized favourably, were

equally apt to be affected by it; and though amputations are moſt liable to this ſymptom, the ſlighteſt injuries, even a ſcratch, will ſometimes bring it on.

It would be difficult, therefore, to eſtabliſh any particular treatment that would tend to prevent accidents of this kind; but Mr. Baſſan, ſurgeon of the Arrogant, one of the line-of-battle ſhips engaged on the 12th of April, mixed laudanum with the dreſſings of all the wounds, and no locked jaw occurred.

Dr. Clarke *, of Dominica, who ſays, that he never ſaw a caſe of tetanus from a wound which did not prove fatal, and being anxious to deviſe ſome means of prevention, gave, from the time the wound or puncture was received, two or three grains of calomel twice a day, till a ſalivation came on, and dreſſed the part with mercurial ointment And after operations he gave three grains of calomel every night, with a grain and a half of opium and three

* Treatiſe on the Yellow Fever, and other Weſt India diſeaſes.

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or four doſes of bark in the day time, without regard to the ſymptomatic fever, till the mercury affected the mouth. The calomel was then given every ſecond night, continuing the opium and bark till the fifteenth day, after which all remedies but the opium were laid aſide. Out of fifteen patients, after amputations that were treated in this manner, only one died, and he had been previouſly in a very irritable ſtate. Dr. Clarke adds, that the prevention of this fatal ſymptom in ſeveral of theſe caſes, may fairly be imputed to the courſe of medicine, as the ſucceſs was about three times greater than in the common practice.

In the Bedford there occurred a curious circumſtance concerning this complaint. In one of the caſes that proved fatal, the ſymptoms did not come on till the wound was ſo far healed that all dreſſing had been laid aſide.

Mr. Wood, ſurgeon of the hoſpital at Jamaica, informed me, that in caſes of the locked jaw from injuries to ſmall members, ſuch as fingers, he had tried the effect of amputating the part after the ſymptoms had come on, but without any effect in putting a ſtop to them. There are other caſes in

books and ſurgeons journals to the ſame purpoſe, and in a paper read before the Royal Society, 7th March, 1765, and recorded in the Annual Regiſter, 1766, a caſe of a woman is related who died of a locked jaw, which did not come on till the 4th day after the wound, made by a ruſty nail running into the foot, had healed.

Would it not appear, from the laſt-mentioned facts, that this ſymptom is not kept up, nor even takes place in the firſt inſtance, from an immediate preſent irritation, but that the conſtitution comes to be ſo modified, or receives ſuch an impulſe, as it were, that the complaint runs its courſe independent of the preſence of that *ſtimulus* which excites it?

It would be difficult to aſſign a ſatisfactory reaſon why this accident is more frequent in hot than in cold climates. External heat, even where it exceeds that of the living body, has no effect in raiſing its temperature *; ſo that we are to ſeek for the effects of it in ſome of thoſe affections peculiar to animal life. And as the outward tempera-

* See experiments on a heated room. Philoſophical Tranſactions, 1775, Vol. LXV.

ture

ture of the air does not affect the general mass of the body, all the effects produced by it must depend on impressions made on the surface of the body and lungs; and the skin, which may be considered as a large expanded tissue of nervous fibres endowed with universal sympathy and great sensibility, affects every organ and every function of the body, according to the state of the air in contact with it, whether cold or hot, moist or dry, pure or vitiated. The same may be said of the *trachea* and *bronchiæ*. This sympathetic sensibility of the skin is chiefly affected by the state of the perspiring pores on its surface; for it is only when these are open that the impression of the air on the skin produces catarrhs, rheumatisms, and internal inflammations in cold climates; and the external temperature in hot climates being such as to keep the pores almost always open, this seems to be a principal reason of that universal irritability prevailing there, and of the general sympathy that prevails between every part, particularly as connected with the organs of perspiration *. This readiness of one part to be

* That species of locked jaw, called by authors the *Trismus Infantium*, to which children are liable the first

be affected by another in hot climates, is well illuſtrated by the ſudden tranſlation of certain diſeaſes. I have ſeen, for inſtance, a catarrh ceaſe, and be converted, as it were, into a diarrhœa, and this as quickly diſappearing, a pain in the foot would ariſe, like an attack of the gout. All this would happen in the ſpace of a few hours.

It may here alſo be aſked, how the muſcles of the jaws come to be more affected with this ſymptom than thoſe of other parts of the body. The only obvious peculiarity of the former, conſiſts in their being, more than any other voluntary muſcles, in a ſtate of conſtant action, in order to prevent the lower jaw from yielding to its gravitation; and if its being more diſpoſed to mor-

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week after birth, is probably owing to the contact of the external air with the ſkin, which is accuſtomed in the womb to a moiſt and warm medium.

Dr. Clarke, of Dominica, in a work before referred to, alleged, that this ſymptom, among the infants of the blacks, is owing to the ſmoke of wood-fires; and he found, that when the mothers, while lying in, could be placed in a ſituation where they could have no fire during the firſt nine days, the infants were never affected with this ſymptom. But as this accident does not occur in the ſmoky hovels of cold climates, it is evident that the concurrence of heat is neceſſary.

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bid ſpaſm depends on this, would it not be worth while, in caſes of wounds, to try the effect of tying up the jaw, as a preventive of this ſymptom?

The cold bath has been recommended on the authority of ſeveral practitioners *, but the efficacy of it has been the ſubject of controverſy. This, like many other controverted points in medicine, may be ſettled by diſcriminating thoſe caſes in which it is likely to ſucceed, from thoſe in which it is not; and it is ſomewhat ſingular, that it has perhaps been as fairly appreciated by Hippocrates †, as it can be done at this hour. He alleges, that the warm bath is the remedy generally to be employed in tetanus; though there are ſome caſes of young and robuſt ſubjects, in which the cold bath has been found to anſwer, but that it is not adviſable in caſes proceeding from wounds. A dry heat on the ſkin ſeems alſo to render the cold bath adviſable. This was a ſymptom in a caſe deſcribed in one of the ſurgeons journals, in which this method of cure was employed with ſucceſs. The exception mentioned by Hippocrates ought,

* Dr. Cochrane, Dr. Wright, and Dr. Currie.

† Aphoriſms, lib. v. ſect. 20, 21, and 22.

however, to be admitted in a qualified degree, for ſome of the ſucceſsful caſes related by Dr. Wright proceeded from wounds, and ſome caſes of the ſame kind have appeared in different publications. Mr. Haliburton, ſurgeon to the naval hoſpital at Halifax, found ſucceſs in a caſe of locked jaw proceeding from a lacerated wound, by uſing the cold bath thrice a day, making five immerſions each time. Opium, bark, and wine, were uſed beſides. Mr. M'Grath, ſurgeon of the Ruſſel, finding the warm bath not to give relief in a caſe not proceeding from a wound, uſed the cold bath every four hours with ſucceſs. It is a preſumption in favour of this practice, that in painful cramps in the extremities, to which ſome people are ſubject, the only relief is found from daſhing cold water on the part. I am acquainted, however, with ſome caſes, both in private and hoſpital practice, in which the cold bath, to all appearance, aggravated the ſymptoms; and it is a further argument againſt the indiſcriminate uſe of it, that Dr. Clarke, of Dominica, ſays, "the cold bath has never anſwered with me, "though I have frequently tried it."

But though wounds are much leſs ſubject to locked jaw in cold climates, they are by

by no means exempt from this ſymptom; for it ſometimes occurs in England, where I have ſeen it even in the winter ſeaſon*.

The cure, ſo far as my experience extends, ſeems to depend chiefly on the judicious employment of opium and the warm bath.

Since my return to England I have received ſome new and uſeful information on this ſubject in converſing with Dr. Warren, phyſician to the King; and as any obſervations derived from ſo much acknowledged ſkill and ſagacity muſt be valuable, I ſhall here relate what he was ſo kind as to communicate to me.

This eminent phyſician, in attending a caſe in which he was nearly intereſted, and in which his endeavours were rewarded with ſucceſs, found the greateſt benefit from opium and the warm bath. The opium was given in the form of tincture, in moderate, but pretty frequent, doſes. The bath was

* Aretæus Cappadox ſays, that tetanus in general is even more apt to occur in winter than in ſummer. De Cauſ. & Sign. Morb. Acut. lib. i. cap. vi.

compoſed

compoſed of milk and water, and the addition of milk was, no doubt, an improvement; for there is ſomething in this as well as oil extremely ſoothing to the human nerves. Dr. Warren had intended to make trial of a bath of oil in caſe this had failed. He mentioned the following obſervation, with regard to the external application of oil, which could only have been ſuggeſted by that anxious attention that was paid to the caſe. It was found, that the uneaſineſs ariſing from the ſpaſm was allayed by conſtantly drawing a feather wetted with oil over the temples, which had an evident effect in lulling the pain and ſpaſm; for when this operation was left off, there was an immediate recurrence of theſe ſymptoms*.

* There are ſeveral valuable practical remarks on this complaint in ſome of the ancient authors, eſpecially Aretæus. Their principal means of cure conſiſted in the application of warm oil to the whole ſurface of the body, particularly of the part affected. This author alſo recommends clyſters of warm oil, occaſionally combined with a medicine called *hiera*, which conſiſted of certain ſpices and gums, with ſome purgative, ſuch as aloes or colocynth. Aretæus Cappad. de Curat. Morb. Acut. cap. vi. Celſus, lib. iv. cap. iii. Goræus in vocabulum, ἱερὰ.

It would appear, therefore, from this as well as the former caſes, that opium and the warm bath are the chief remedies yet known which are of ſervice in this complaint, and much will depend on the judicious management of them. The method of adminiſtering the opium, recommended by Dr. Warren, ſeems to be the moſt judicious, eſpecially in conſtitutions not habituated to this medicine; and I have reaſon to think that cures are frequently miſſed by too great doſes of this medicine.

There is a certain medium in giving opium, by which its beſt effects are obtained, for in an under doſe it will produce diſturbance inſtead of reſt; and when it is given in large quantities, it frequently defeats the very end for which it is given, by throwing the body into convulſions which terminate in death. The rule for judging of the proper limits of this doſe is, by its effect in inducing that ſtupor or inſenſibility which renders the ſenſes incapable of irritation; for in this, as well as in every other caſe of diſeaſe, the cure ſeems ultimately to be the work of nature, the effect of medicine being only a ſecondary operation, by which it removes

moves ſome obſtacle to the natural efforts of the conſtitution. Though a doſe of opium greater than ordinary is required to produce this inſenſibility in caſes of ſpaſm, and though the conſtitution in that ſituation will bear more, yet even here it may be given to exceſs; and by beginning with ſmall quantities, and giving it in frequent rather than large doſes, the conſtitution will thereby be better reconciled to it, and it will alſo with more convenience admit of that gradual increaſe which is peculiarly neceſſary with this medicine. Theſe ideas were ſuggeſted to me by Dr. Warren; and it may be farther added, in recommendation of his method, that the liquid form is preferable to the ſolid, as the effects of it will ſooner be ſeen, and a better judgment can be formed how far it is proper to puſh it.

Great attention is alſo neceſſary in regulating the heat of the bath; for if it is not ſufficiently warm, it will not have the effect of producing a due relaxation; and if it ſhould be too hot, it will ſtimulate too much, and will have the farther inconvenience of making the patient very faint in a ſhort time, and the ſucceſs will depend greatly

greatly on the length of time for which the bath is continued. A private practitioner of Jamaica informed me, that he kept a patient with this complaint for five hours in the warm bath, and that he recovered. It cannot be well regulated without a thermometer, and 93° upon Fahrenheit's ſcale is perhaps the beſt temperature. Much will depend, however, on the conſtitutions of patients, as there is a great difference in individuals in this reſpect, ſo that the heat ſhould be raiſed or lowered ſo as to afford the ſenſation of gentle and comfortable warmth. I have kept a patient in a bath thus regulated for ſix hours, which he could not have endured for half an hour had the heat been three or four degrees higher.

The circumſtance next in conſequence, in the cure of this complaint, is the keeping up a moiſture on the ſkin, and guarding the ſurface of the body from the acceſs of the air. This is particularly neceſſary with regard to the part itſelf, which ſhould be conſtantly enveloped in warm, anodyne, and emollient applications. The good effects of this is particularly exemplified in the

the caſe which recovered under the care of Mr. Harris, who gave the diaphoretic medicine, compoſed of antimonial wine and laudanum, and applied the anodyne cataplaſm to the external *fauces*. It was remarked, that the locked jaw was moſt incident to thoſe wounded men, who lay in parts of the hoſpital where they were expoſed to a current of air; and the caſes of tetanus that moſt uſually occur in the Weſt Indies, independent of wounds, are thoſe of ſlaves who fall aſleep in the night-time in the open air.

The only other remedy that has been recommended for this moſt alarming ſymptom, ſo far as I know, is Peruvian bark. Dr. Ruſh, phyſician to the American army in the late war, recommends it from his own obſervation, with wine and bliſters, and to dreſs the wounds with mercurial ointment. From ſome trials I have ſince made of the bark in St. Thomas's hoſpital, I have reaſon to think well of it as a remedy in this diſeaſe.

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There is a ſingular ſpecies of accident to which engagements at ſea are liable, called, perhaps improperly, *the wind of a ball*. In whatever manner it is accounted for, it is a fact, that a part is ſometimes ſeverely hurt, and even life deſtroyed, without any viſible external injury or breach of the parts, nor any appearance of the body from whence the injury proceeded*. There were two inſtances

* This is a fact which does not admit of doubt; but the manner in which the effect is here produced is a matter of conjecture. It is perhaps owing to the compreſſion and tremor of the air in conſequence of its reſiſtance to the motion of the ball. We can alſo conceive, that, with regard to an yielding part, ſuch as the ſtomach or abdomen, a body flying with great velocity may even, for a moment, diſplace a portion of it by paſſing through the ſame ſpace, without any other mechanical injury than contuſion, in a manner ſimilar to what happens to two balls in the act of colliſion in philoſophical experiments, made to illuſtrate the nature of elaſticity. From a fact to be mentioned hereafter, of a bone being broke to pieces, though the integuments were not injured, and as one leg is not uſually affected by the ball which breaks or carries off the other, it would appear that mere proximity is not ſufficient to produce this effect, and that there muſt be ſome ſort of contact. It is, perhaps, explicable as follows. It has been aſcertained, that all balls and bullets, except thoſe from rifled pieces, have a rotatory motion in their flight. It is evident, that this motion on one ſide of the ball will coincide with the direction of its flight, and the other will be in

ſtances in the laſt battle of a ball paſſing cloſe to the ſtomach, and producing inſtant death, The one was a lieutenant of the Royal Oak, the other a common ſailor of the Bedford. A man in another ſhip, in conſequence of a ball paſſing cloſe to his belly, remained without ſenſe or motion for ſome time, and a large livid tumor aroſe on the part, but he recovered. I attended a man at the hoſpital at Barbadoes, who had the buttons of his trowſers carried off by a cannon ball, without any breach in the ſkin. The *pubis* was livid and ſwelled for ſome time after: he ſuffered exquiſite pain from ſtrangury, which ſeemed to proceed from a *paralyſis* of the bladder, for he voided no urine without a catheter for near three months, after which time he recovered. I know a brave young officer* in the army,

in the oppoſite direction. Now if the latter ſide ſhould come in contact with any part of the body, it is conceivable, that in place of carrying it away, it would roll over it, as it were, and only make a contuſion. Some have attempted to account for theſe accidents by alleging, that they may proceed from a ſpent ball or obtuſe ſplinter ſtriking the part; but if this were the caſe, the offending body would drop upon the deck, and be perceived, which is not the caſe.

* The honourable Captain Fitzroy, now Lord Southampton.

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who had his epaulette carried off by a cannon ball at Charleſtown, in conſequence of which the ſhoulder and adjacent parts of the neck were affected for ſome time. A like accident happened to a marine officer in one of the late engagements; but in neither of theſe was the head materially affected, nor is it ſo apt to be affected in this way as the ſtomach. I never knew death the conſequence of the wind of a ball on the head; though an officer* in the Sultan, at the battle of Grenada, was ſo ſtunned by a ſhot paſſing cloſe to his temple, as to be inſenſible for ſome time, but he recovered entirely in a few hours†.

In ſome caſes the bones ſuſtained a ſevere injury from accidents of this kind. Two inſtances of it have come to my knowledge: the one was an officer, who fell down during an engagement without any obvious cauſe. Upon examination, the thigh was found to be broken, and the limb was two inches ſhorter, which ſeemed to proceed

* Colonel Markham.

† Animals are affected by theſe accidents as well as men. A cow in the Duke was killed in one of the actions in April, by a double-headed ſhot paſſing cloſe to the ſmall of her back.

from the bone being pulverized, as it were. There was no pain. The integuments were not in the leaſt injured; ſo that this appears to have been what is called the wind of a ball, but what ought more properly, perhaps, to be termed the *bruſh* of a ball. In the other inſtance, two of the falſe ribs were fractured and diſlocated, with very little viſible affection of the ſkin, though the clothes were torn. This accident proved fatal.

The claſs of wounds moſt peculiar to a ſea engagement, are ſcorches from the accidental exploſion of gunpowder; and in moſt of the campaigns in which I have ſerved, they have been very frequent and fatal. Few accidents, however, of this kind happened in the late engagements; ſo that we had but little experience of this ſort of wounds in April, 1782. But on former occaſions they were very frequent, and the beſt application to the burnt parts was found to be linſeed oil, which ſome of the ſurgeons mixed with lime-water, others with ceruſſe, and both compoſitions anſwered well. Opium was found of great uſe in alleviating pain and procuring reſt, thereby conducing to recovery, as well as preſent eaſe, care being taken to guard againſt coſtiveneſs by the uſe of clyſters.

In

In the battles of 1780 and 1781, one-fourth part of the whole killed and wounded was from this ſort of accident; but on the 9th and 12th of April, 1782, only two accidental exploſions of gunpowder happened in the whole fleet, by one of which one life was loſt, by the other, two. This difference was owing partly to greater experience and habits of caution acquired in the courſe of the war, and partly to certain improved methods in working the artillery introduced by Sir Charles Douglas: theſe conſiſted, 1ſt, in wetting the wads, which prevents their inflaming and blowing back, when in battle the weather ſide of the ſhip is engaged; a circumſtance which, without this precaution, gives occaſion to a number of accidents, by the burning parts catching the looſe powder, or ſetting fire to the cartridges. 2dly, In the uſe of gooſequill tubes and ſmall priming boxes, made of tin, inſtead of the large horns formerly in uſe, whereby great quantities of powder were ſcattered about and expoſed to accidental fire. 3dly, In the uſe of locks, which was practiſed with great ſucceſs in ſeveral ſhips, and was found to make the operation both more ſafe and more expeditious.

It frequently happens that men bleed to death before aſſiſtance can be procured, or loſe ſo much blood as not to be able to go through an operation. In order to prevent this it has been propoſed, and on ſome occaſions practiſed, to make each man carry about him a garter, or piece of rope-yarn, in order to bind up a limb in caſe of profuſe bleeding. If it ſhould be objected, that this, from its ſolemnity, may be apt to intimidate common men, officers at leaſt ſhould make uſe of ſome ſuch precaution, eſpecially as many of them, and thoſe of the higheſt rank, are ſtationed on the quarter deck, which is one of the moſt expoſed ſituations, and far removed from the cockpit, where the ſurgeon and his aſſiſtants are placed. This was the cauſe of the death of Captain Bayne, of the Alfred, who, having had his knee ſo ſhattered with a round ſhot, that it was neceſſary to amputate the limb, expired under the operation, in conſequence of the weakneſs induced by loſs of blood in carrying him ſo far. As the Admiral, on theſe occaſions, allowed me the honour of being at his ſide, I carried in my pocket ſeveral tourniquets of a ſimple conſtruction, in caſe

accidents to any perſon on the quarter deck ſhould have required their uſe.

It ſometimes happens, however, that no hæmorrhage ariſes from a limb being carried off by a ball. The ſurgeon of the Fame related to me an inſtance of this, in which the thigh was cut through by a ſhot near its upper part, all except a little fleſh and ſkin, and yet not the leaſt hæmorrhage followed. This may have been owing to the limb being entirely ſevered, or nearly ſo, whereby the veſſels contracted more eaſily than if they had been partially divided. All that was done for this man was to remove the limb, and to ſaw off the jagged end of the bone. He ſurvived ſix days, ſtill without bleeding, and died of the locked jaw.

One of the niceſt and moſt important points upon which a ſurgeon is called to decide, is with regard to the propriety of amputation, and alſo the period at which it ſhould be performed. With reſpect to the former, I feel myſelf incompetent to give any directions, being unacquainted with the practice of ſurgery. With reſpect to the ſecond, I remember to have heard the late

Dr. William Hunter, in his lectures, remark, that men whoſe ſtrength has been impaired by the confinement and long ſuffering from an injury, ſurvive amputation more frequently than thoſe who undergo it in the heighth of their health and ſtrength after a recent injury, and was therefore inclined to diſſuade from an early operation, if the nature of the wound would admit of delay. There are ſeveral reaſons, however, which render early amputation more adviſeable for ſailors, than for ſoldiers or others who live on ſhore. 1ſt. The motion of a ſhip renders fractures more unmanageable. 2dly. It is obſerved by Mr. Home, that the conſtitution of ſailors being reduced by their manner of life, they are in ſome meaſure at all times in the ſtate deſcribed by Dr. Hunter as favourable to amputation*.

I was

* The following ſtatement may ſerve as a ſubject of compariſon to thoſe who perform amputations on board of ſhips at ſea.

In Haſlar hoſpital, between the year 1772 and the year 1778, there were four patients had the thigh amputated, of whom there died one; twenty-ſeven had the leg amputated, of whom there died ten; two had the forearm amputated, of whom there died none; ſeven had their arms amputated, of whom there died two. Total amputations forty. Deaths thirteen.

After the action of the 27th of July 1778, there were brought

I was informed by ſeveral of the ſurgeons, that the method of taking up the veſſels by the *tenaculum* was found to anſwer extremely well; and many of them imagined, that the locked jaw was not ſo apt to be brought on by this mode of operation as by that of the needle. But it is hardly to be attempted in time of action, for want of ſteadineſs and a good light, and it was chiefly at the hoſpitals that this practice was found ſo ſucceſsful.

Mr. Alanſon's method of amputation by a great retraction of the muſcles, ſo that the fleſhy parts ſhall meet over the bone and unite in the firſt intention, was attended with great ſucceſs in the Weſt Indies, particularly at the hoſpital at St. Lucia, under the care of Mr. Bulcock.

It may be remarked, that though all ſores and wounds in the foot and leg are difficult

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brought to Plymouth hoſpital the following caſes of ſtumps, in conſequence of amputations performed on board; ſeven thighs, of whom one died; five legs, of whom two died; fourteen arms, of whom five died; two fore-arms, of whom none died. Total amputations twenty-eight. Deaths eight.

Eight patients underwent amputation after coming to the hoſpital, of whom three died. I owe theſe ſtatements to Mr. Home, who was one of the aſſiſtant ſurgeons at Plymouth in 1778.

of cure in a hot climate, I have obſerved, that, where the conſtitution is good, thoſe in the thighs, arms, trunk, and head, are rather more eaſy of cure than in Europe, and that parts divided by inciſion very readily unite by the firſt intention. Inſtances of recovery from wounds in the moſt unfavourable circumſtances, occurred after the diſaſter of Colonel Baillie in 1780 in the Eaſt Indies, which do not ſeem poſſible in a cold climate. In reaſoning upon this, it may be ſaid, that as healing depends on a certain degree of vigour in the powers of life, this ſhould not err either on the ſide of exceſs or defect. If it is too great, as in the caſe of a hale, plethoric conſtitution in a cold climate, too much inflammation is apt to be excited; and if too feeble, as happens in a hot climate, in the lower extremities, which are far removed from the ſource of life and circulation, the ſalutary effort is not ſtrong enough to generate new organiſed parts. But in the trunk of the body, in ſuch a climate, the powers of the animal œconomy are in that juſt medium which is moſt favourable to this operation of nature.

PHARMACOPŒIA THERAPEUTICA

NAUTIS ACCOMMODATA.

MEDICAMENTORUM ſimpliciorum, quæ ad medicinam faciendam apud nautas maxime ſunt neceſſaria, catalogum, methodum item medendi, quatenus rem medicamentariam ſpectat, huic operi ſubnectere mihi non alienum videtur.

Catalogum iſtum jam publico jure exhibere licet, materiæ medicæ enim apparatus, quocum chirurgi militiâ navali merentes inſtrui debent, de novo in anno 1796 conſtitutus eſt. In hac recenſione rerum plus quam dimidium reciſum; et eôdem tempore ſummâ auctoritate decretum eſt, ut publicis ſumptibus chirurgi medicamentis, quæ primarium obtinent locum in morbis curandis, in perpetuum donarentur.

Rei medicæ ubique quidem conducit, potiſſime autem apud nautas et milites, remediorum ſimplicitati rationem habere, tum numero, tum præparatione, tum adminiſtratione. Quandocunque plura medicamenta ſimul adhibentur, ſingulorum veros effectus dignoſcere vix poſſibile eſt. Quoniam etiam in navibus deſunt armamenta pharmaceuticæ exquiſitiori exequendæ commoda, formulis quam minime

nime perplexis ſtudere oportet. Methodo quoque exacte ordinatâ varias manipulationes et miniſteria faciliora et certiora fiunt. Talis denique ratio rerum facilius et commodius in militiâ quam in medicinâ apud privatos exercendâ perfici poteſt, in illa enim omnes ægri ſexûs ſunt unici, adulti omnes, et univerſi fere temperamento firmo gaudent.

Catalogus Medicamentorum quibuſcum Chirurgi ſumptibus publicis donantur.

Cinchonæ in pulverem tritæ, libræ octo*.—Hydrargyri unciæ quatuor.—Calomelanos unciæ quatuor.—Unguenti hydrargyri fortis unciæ quatuor.—Opii unciæ quatuor.—Pulveris antimonialis uncia una.—Succi limonis congii novem.—Ipecacuanhæ in pulverem tritæ unciæ duæ.—Magneſiæ vitriolatæ libræ octo.—Natri vitriolati libræ quatuor.—Rhabarbari Indici in pulverem triti unciæ tres et dimidia.—Sennæ libra una.—Radicis jalapii unciæ octo.—Emplaſtri cantharidis libra una.—Kali præparati unciæ quatuor.—Spiritus vini rectificati libra una.—Acidi vitrioli diluti libræ duæ et unciæ octo.

Quantitatem cujuſque medicamenti in hac enumeratione, ac in ea quæ ſequitur, notatam, in uſum centenorum hominum ſufficere arbitrio publico ſtatutum eſt, et quantum uſu abſumatur, fit tantidem ſupplementum quotannis, ut fiat iterum copia integra quæ principio ſuppeditata eſt. Excipiuntur autem acidum vitrioli dilutum, pulvis antimonialis, et ſuccus limonis, quæ ſubminiſtrantur ſubinde pro re natâ ſecundum regulam olim inſtitutam antequam alia medicamenta publicâ munificentiâ conceſſa fuerant.

* Cum ad navigationem in Aſiam, Africam, vel regiones torridas Americæ, expediuntur naves, tum copiæ duplæ ſuppetit munimen.

Catalogus Medicamentorum quibus Chirurgi ſuis ſumptibus ſeſe inſtruere imperantur.

Aloës ſocotrinæ uncia una.—Antimonii tartariſati drachmæ quatuor.—Gummi ammoniaci uncia una.—Gummi Arabici unciæ quatuor.—Magneſiæ unciæ quatuor.—Florum chamæmeli unciæ octo.—Quaſſiæ uncia una.—Cretæ præparatæ unciæ quatuor.—Camphoræ unciæ duæ.—Mannæ unciæ quatuor.—Nitri purificati unciæ octo.—Florum ſulphuris libra una.—Zinci vitriolati uncia una.—Olei terebinthini unciæ quatuor.—Liquoris volatilis cornu cervi unciæ quatuor.—Tincturæ lavendulæ unciæ tres.—Olei menthæ piperitidis drachmæ duæ.—Salis cornu cervi uncia una.—Radicis zinziberis unciæ quatuor.—Gummi guaiaci unciæ duæ.—Tincturæ ſcillæ uncia una.—Chryſtallorum tartari in pulverem tritarum unciæ octo.—Adipis ſuillæ unciæ octo.—Ceræ flavæ unciæ octo.—Cupri vitriolati uncia una.—Argenti nitrati drachma una.—Ceruſſæ acetatæ uncia una.—Aquæ lythargyri acetati unciæ octo.—Hydrargyri nitrati rubri uncia una.—Emplaſtri ceræ unciæ octo.—Emplaſtri lithargyri unciæ octo.—Emplaſtri lithargyri cum hydrargyro unciæ quatuor.—Emplaſtri lithargyri cum gummi unciæ quatuor.—Unguenti reſinæ flavæ unciæ octo.—Unguenti ceræ unciæ octo.—Lapidis calaminaris unciæ octo.

Hæc publicâ auctoritate imperantur, chirurgis autem licet aliis medicamentis qualibus & quantis velint ſe inſtruere.

FORMULÆ

FORMULÆ QUÆDAM MEDICAMENTORUM AD MEDICINAM FACIENDAM APUD NAUTAS ACCOMMODATIORES.

IN FEBRE CONTINUA.

PULVIS EMETICUS COMMUNIS.

℞. PULVERIS radicis ipecacoanhæ grana decem, antimonii tartarisati grana duo, misce.

MISTURA CATHARTICA COMMUNIS.

℞. Foliorum sennæ uncias sex, aquæ ferventis libras sex. Macera donec pene refrixerit, & adjice vel natri vitriolati vel magnesiæ vitriolatæ libram unam cum semisse. Dein cola & admisce tincturæ sennæ uncias octo. Dosis est ad uncias tres.—Interdum conducit adjicere singulis dosibus, vel pulpæ tamarindorum semunciam, vel mannæ drachmas duas, vel antimonii tartarisati semigranum, vel pulveris jalapii grana decem.

PULVIS CATHARTICUS.

℞. Calomelanos grana sex, pulveris radicis jalapii granâ duodecim. Misce.

ENEMA COMMUNE.

Aquæ marinæ tepidæ uncias duodecim.

POTUS COMMUNIS.

Decoctum hordei.—Conveniat adjicere singulis libris pro re natâ, vel pulpæ tamarindorum unciam dimidiam, vel crystallorum tartari drachmam unam, vel

vel nitri ſcrupulum unum, vel acidi vitriolici diluti guttas decem, vel ſucci limonum unciam unam vel alteram, vel gummi arabici ſcrupulos duos, vel vini uncias quatuor, ſex, vel octo, vel fruſtum panis toſti.

VINUM EMETICUM.

℞. Antimonii tartariſati ſcrupulos duos, aquæ ferventis uncias duas, vini albi uncias octo. Solve antimonium in aquâ & adde vinum. Aſſumatur drachma una omni quadrante horæ, donec vel excitetur vomitus, vel alvus ſolvatur. Deinde aſſumatur ſemi-drachma ſextâ quâque horâ.

Sumantur pulveris antimonialis grana tria vel quatuor quartâ vel ſextâ quâque horâ. Ne diſperdatur, adhibeatur vel formâ pilulæ cum aliquo idoneo additamento, vel ſi detur in formâ pulveris adjiciatur pauxillum farinæ, vel alicujus pulveris innocui.

MISTURA SALINA.

℞. Kali præparati drachmas duas, ſucci limonum, vel aceti, vel acidi vitrioli, quantum ſatis ſit ad ſaturandum ſalem, aquæ puræ uncias duodecim. Bibatur ſexta pars poſt unamquamque doſim pulveris antimonialis. Conferat adjicere interdum vel cretæ præparatæ ſcrupulum, vel nitri grana decem.— Conducit aliquando ſumere hanc miſturam ſtatim poſtquam kali & ſuccus limonum mixta fuerint, ſcilicet in ipſa ebullitione. Hoc imprimis utile eſt cùm vomitus vel nauſea vexent.

Fieri poteſt talis miſtura cum ſale cornu cervi loco kali, quæ magis prodeſt in quibuſdam febribus, præcipue ſi malum acceſſerit rheumaticum.

PILULA

* PILULA DIAPHORETICA.

℞. Opii purificati grana duodecim, antimonii tartarisati grana sex, conservæ rosæ vel micæ panis semi-drachmam. Contunde simul & divide in pilulas viginti quatuor. Devoretur una horâ somni. Interdum prosit dare unam bis die, vel duas horâ decubitus.

† MISTURA SEDATIVA.

℞. Misturæ camphoratæ uncias sex, tincturæ opii guttas viginti. Misce. Bibatur tertia pars ter die.—Aliquando conducit admiscere singulis dosibus aquæ ammoniæ acetatæ drachmas tres, vel vini emetici guttas triginta.

BOLUS SEDATIVUS.

℞. Confectionis aromaticæ scrupulum unum, opii purificati grani quartam partem, tincturæ opii guttas quatuor. Misce. Conducit adjicere interdum castorei Russici grana decem. Assumatur sextâ quâque horâ.

BOLUS SERPENTARIÆ COMPOSITUS.

℞. Pulveris serpentariæ Virginianæ grana decem, camphoræ grana quatuor, confectionis aromaticæ quantum satis sit. Assumatur ter die.—Interdum conducit addere pulveris cinchonæ drachmam dimidiam, vel superbibere decocti cinchonæ uncias duas.

Duæ compositiones proxime supra dictæ febri ingravescenti occurrere statuuntur, urgentibus scilicet virium prostratione, subsultu tendinum, et delirio miti, at calore omnino vel parum aucto. Prosunt eodem tempore vinum et vesicatoria.

ELECTUARIUM AD CONVALESCENTES.

℞. Pulveris cinchonæ, florum chamæmeli, singulorum unciam unam, pulveris zinziberis scrupulos duos, syrupi quantum satis sit. Dosis est circi-

* Hæc formula ex Pharmacopœia Nosocomii Sti. Thomæ deprompta est.

† Vide pag. 378.

ter

ter drachmam ter die.—Interdum adjiciantur vel rubiginis ferri drachmæ tres, vel pulveris ſerpentariæ Virginianæ drachmæ duæ.

IN FEBRE INTERMITTENTE.

Adhibeantur in initio eadem medicamenta ac in initio febris continuæ. Deinde

Sumatur cinchonæ drachma una, ſecundâ vel tertiâ quâque horâ, vel etiam ſingulis horis, abſente paroxyſmo febrili.—Interdum confert dare ſingulas doſes ex ſpiritûs vini tenuis (*rum* dicti) unciâ unâ.

Si cinchona fruſtra adhibita fuerit, fauſte adhiberi poſſint medicamenta infra præſcripta.

* ℞. Zinci calcinati ſemi drachmam, conſervæ roſæ vel panis quantum ſatis ſit. Contunde ſimul & divide in pilulas quindecim. Sumatur una ter die, augendo doſim ſi premerit morbus, & ſi ferat ventriculus.

Vel,

℞. Zinci vitriolati grana duodecim, aquæ puræ uncias tres. Sumatur tertia pars ter die, augendo doſim ſi opus fuerit & ſi ferat ventriculus.

Vel,

† ℞. Tincturæ rhabarbari uncias duas, tincturæ ſennæ drachmas ſex. Miſce. Sumatur paucas horas ante paroxyſmum.

Vel,

‡ Cinchonâ fruſtra datâ, aliquando conferat dare ægro quotidie, vel calomelanos, vel pilularum ex hydrargyro quantum & quamdiu ſufficiat ad levem ciendum ptyaliſmum, & deinde inſtituere curam de integro cum cortice Peruviano.

* Vide pag. 442.

† Ex auctoritate Cl. Huck Saunders.

‡ Ex auctoritate Cl. Huck Saunders.

Vel,

Vel,

Sumantur tincturæ opii guttæ triginta duas horas ante acceſſum febris, ex poculo potûs communis cum liquoris volatilis cornu cervi drachmâ unâ, vel cum tincturâ rhubarbari et ſennæ ut ſupra præſcriptum.

Vel,

℞. Arſenici albi in ſubtilem pulverem triti grana decem, conſervæ cujuſvis vel micæ panis drachmas tres contunde & divide in pilulas octoginta. Sumatur una ter indie.

Vel,

Sumantur ſolutionis ſaturatæ arſenici albi guttas decem ter vel ſæpius indie.

Vel,

℞. Arſenici albi in pulverem triti drachmam unam, aquæ puræ quod ſatis ſit, coque tantiſper balneo aquæ ad arſenici ſolutionem, et per chartam cola. Sint ſolutionis menſurâ unciæ quindecim.

℞. Hujus ſolutionis drachmam unam, aquæ puræ uncias tres, ſpiritus vini tenuis unciam unam, ſacchari drachmas duas. Miſce. Doſis uncia dimidia bis indie.

IN DIARRHOEA SIMPLICI.

BOLUS AD DIARRHOEAM.

℞. Cretæ præparatæ ſcrupulum unum, pulveris rhabarbari grana quindecim, pulveris corticis cinnamomi grana ſex, opii purificati granum dimidium, tincturæ opii guttas quinque, ſyrupi quantum ſatis ſit. Semel ſumatur.

℞. Miſturæ cretaceæ (Pharm. Lond.) cum duplici gummi arabico libram unam, tincturæ opii guttas decem. Abſumatur totum partitis vicibus nychthemero, incipiendo duodecim horas poſt datum medicamentum noviſſime præſcriptum.—Interdum adjiciatur tincturæ cinnamomi uncia dimidia.

* Hæc formula adhibetur cum ſucceſſu felici in Noſocomo Haſlarienſi.

IN

IN CHOLERA MORBO.

℞. Decocti hordei vel avenæ libras tres, pulveris gummi arabici unciam unam cum ſemiſſe, tincturæ opii guttas triginta. Hauriatur quam primum libra una, & deinde libra dimidia omni horâ uſque ad levamen mali.—Si parari poterit caro vitulina, vel pullus, juſculum tenue ex uno vel altero horum confectum, vice decocti ſupra dicti adhibeatur.

IN DYSENTERIA ACUTA.

Sumat æger quamprimum emeticum commune.

℞. Decocti hordei vel avenæ libras duas, ſalis cathartici unciam unam cum ſemiſſe, antimonii tartariſati grana duo. Miſce. Hujus hauriatur tepide primò libra dimidia, & deinde unciæ quatuor omni horâ donec alvus copioſe & iteratim dejecerit.

℞. Pulveris ipecacoanhæ grana duodecim, cretæ præparatæ drachmas duas. Miſce et divide in chartulas duodecim. Sumatur una ter die. Si æger vehementer febricitârit ſatius erit dare ter die vini emetici drachmam unam ex cyatho amplo decocti hordei tepidi.

℞. Pulveris ipecacoanhæ grana duo, pulveris opii purificati exſiccati granum unum, nitri grana decem. Miſce. Sumatur horâ ſomni.

ENEMA EMOLLIENS.

℞. Amyli unciam dimidiam, aquæ puræ uncias decem. Coque ad idoneam ſpiſſitudinem.

Vel,

℞. Seminum lini drachmas ſex, aquæ puræ uncias duodecim. Coque per quadrantem horæ & cola liquorem pro enemate.

ENEMA ANODYNUM.

℞. Enematis emollientis uncias quatuor, tincturæ opii guttas quadraginta. Miſce.

IN DYSENTERIA CHRONICA.

BOLUS CATHARTICUS.

℞. Pulveris rhabarbari grana quindecim, calomelanos grana quinque. Miſce, fiat pulvis. Mane ſumendus ex idoneo vehiculo, & repetendus poſt paucos dies ſi opus fuerit.—Vice hujus interdum conducat dare miſturæ catharticæ communis uncias duas.

SOLUTIO CAMPECHENSIS.

℞. Extracti ligni Campechenſis drachmam unam cum ſemiſſe, tincturæ cinnamomi unciam unam. Tere ſimul et admiſce aquæ puræ uncias quinque. Sumatur uncia una ter die.

DECOCTUM AMARUM.

℞. Corticis ſimaroubæ drachmam unam, vel quaſſiæ drachmam dimidiam, aquæ puræ libram unam cum ſemiſſe. Coque pauliſper et cola. Abſumatur totum quotidie doſibus tripartitis. Adjici poſſint ſingulis doſibus pro ratione ſymptomatum, vel cretæ præparatæ ſcrupulus unus, vel pulveris ipecacoanhæ granum unum, vel tincturæ cinnamomi drachmæ duæ, vel tincturæ opii guttæ quinque.

Siquando hic morbus contumax fuerit, confert illinere quotidie hypogaſtrium unguenti ex hydrargyro drachmâ dimidiâ.

Sit pro potu communi in hoc morbo aqua pura, fruſto panis recens toſti adjecto, & pauxillo ſpiritus vini tenuis (*rum* dicti) admixto. Sit pro victu communi ſalab, vel farina tritici in pulmentum tenue ex aquâ purâ cocta.

℞. Ol. amygdalæ vel olivæ, ceræ flavæ, ſingularum unciam dimidiam, ſpermatis ceti drachmas duas, liqueſcant leni igne et poſtquam frigefacta fuerint terantur cum vitello unius ovi, vel mucilaginis quantum ſatis ſit, admiſcendo paulatim aquæ puræ uncias quinque, et addantur vel tincturæ thebaicæ guttæ quindecim, vel tincturæ opii camphoratæ drachmæ tres, ſacchari albi drachmæ duæ. Doſis ſeſcuncia ſextâ vel octavâ quâque horâ, ubicumque excoriationem detur locus ſuſpicandi inteſtinorum.

IN INTESTINIS INFLAMMATIS.

SOLUTIO SALIS CATHARTICI.

℞. Decocti hordei libram unam, magneſiæ vitriolatæ uncias duas. Miſce ut fiat ſolutio. Bibatur, poſt ſanguinis miſſionem, uncia una omni ſemihorâ donec alvus bis dejecerit.

Adhibeantur hypogaſtrio cucurbitulæ cruentæ, vel hirudines plures. Admoveatur ibidem epiſpaſticum ſatis amplum. Infundatur enema cum oleo et pauxillo ſalis cathartici.

IN ILEO, vel COLICA PICTONUM, vel morbo in regionibus torridis *DRY BELLY ACHE* dicto.

℞. Aquæ menthæ ſemilibram, magneſiæ vitriolatæ uncias duas. Miſce. Sumatur uncia una omni horâ.

* PILULÆ CATHARTICO-ANODYNÆ.

Extracti colocynthidis compoſiti drachmam dimidiam, opii granum unum & dimidium, olei menthæ guttam unam. Contunde in maſſam & divide in pilulas decem. Sint pro una doſi. Paucas poſt horas, ſi alvus non rite reſponderit, exhibeantur miſturæ catharticæ unciæ duæ, vel † olei ricini uncia una;

* Hæc formula ex Pharmacopœiâ Noſocomii Sti. Thomæ excerpta eſt.

† Vice olei ricini dare licet olei amygdalæ unciam unam cum tincturæ ſennæ unciâ dimidiâ.

& repetantur ut opus fuerit.—Interdum in hoc malo divexat vomitus cui opitulatur miſtura ſalina in ebullitione, vel magneſiæ ſemidrachma ex aquæ menthæ ſeſcunciâ. Calomelas tum optimum catharticum, ob pondus enim ægre rejicitur.

Perfricetur hypogaſtrium oleo tepido.

Ineat æger in balneum tepefactum ad 93° therm. Fahren. per horam unam vel etiam diutius.

Denique ſuffletur in anum fumus nicotianæ.

Vel,

℞. Nicotianæ drachmam unam, aquæ puræ ferventis libram unam.—Macera per horam dimidiam & cola pro enemate.

In ileo ſæpe prodeſt miſſio ſanguinis ex abdomine per hirudines vel cucurbitulas cruentas.

IN HÆMORRHOIDE.

BOLUS HÆMORRHOIDALIS.

Sumatur florum ſulphuris drachma dimidia, cum copiâ duplici cryſtallorum tartari ſemel vel bis die, ut alvus plus aut minus ſegnis fuerit.

Si ſanguinis ex ano profluentis magna fuerit vis, & præcipue ſi ex alto fonte effluxerit, valde proderit medicamentum infra præſcriptum.

* ℞. Olei lini ſine calore expreſſi, tincturæ rhabarbari, ſingulorum drachmam unam. Miſce. Sumatur ter indie.—Vice olei lini adhibere licet olei amygdalæ drachmam unam, cum mucilaginis gummi arabici drachmâ unâ.

IN ALVO ASTRICTA.

PILULÆ LAXANTES.

℞. Aloes ſocotrinæ drachmam dimidiam, pulveris rhabarbari vel jalapii drachmam unam, pulveris zinzi-

* Hæc formula ex auctoritate Cl. Griffiths. In periculis a me ipſo factis feliciſſimum ſucceſſum ex hoc medicamento percepi.

beris

beris drachmam dimidiam, mucilaginis gummi arabici quantum ſatis ſit. Contunde et divide in pilulas quadraginta. Sumantur una, duæ, vel tres pro re natâ.

ELECTUARIUM ECCOPROTICUM.

℞. Pulveris jalapii unciam dimidiam, pulpæ tamarindorum unciam unam, pulveris zinziberis ſemidrachmam, ſyrupi *melaſſes* dicti quantum ſatis ſit. Sumatur circiter drachma pro re natâ.—Interdum proſit adjicere cryſtallorum tartari vel ſalis cujuſvis cathartici unciam dimidiam.

IN CATARRHO.

LINCTUS.

℞. Conſervæ roſæ mellis vel ſyrupi ſpiſſi unciam unam, mucilaginis gummi arabici unciam dimidiam, ſucci limonis acoci, vel acidi vitriolici quantum ſatis ſit ad gratum ſaporem conciliandum. Miſce. Sumatur pauxillum ſæpius.—Interdum adjiciatur vel ſalis nitri drachma dimidia, vel tincturæ opii guttæ decem.

Potui detur decoctum hordei in quo coquatur uvarum paſſarum uncia una, & ſub finem coctura adjiciantur ſeminum lini drachmæ duæ pro ſingulis libris decocti.

Si febricitârit æger, ſumatur miſtura ſalina cum pulveris antimonialis gramis tribus ter die.

IN PLEURITIDE ET PERIPNEUMONIA.

℞. Decocti hordei libras duas, pulpæ tamarindorum quantum ſatis ſit ad gratum ſaporem, nitri drachmam unam. Miſce. Hauriatur affatim. N. B. Si tamarindi moverint alvum ſæpius quam ſemel aut bis die adhibeatur vice ejus ſyrupus *melaſſes* dictus,

Sumatur miſtura ſalina cum pulveris antimonialis granis tribus ſexta vel quartâ quâque horâ.

Præmittatur ſemper venæ ſectio, et adhibeatur victus tenuiſſimus.

IN HÆMOPTOE.

Hauriat æger infuſi roſæ uncias tres quater die. Interdum adjiciatur ſalis cathartici amari drachmam unam. Dentur in intervallis nitri grana quindecim, vel ſcrupulus ex poculo aquæ, vel conſervæ roſarum drachmâ.

HAUSTUS OLEOSUS.

* ℞. Olei amygdalini, aquæ menthæ, ſingulorum unciam, mannæ drachmas tres. Miſce. Sumatur ter die. Sæpe conducit adjicere ſingulis doſibus tincturæ opii guttas quatuor vel quinque.

IN TUSSI ASTHMATICA.

PILULÆ PECTORALES.

℞. Gummi ammoniaci drachmas tres, ſaponis Hiſpanienſis drachmas duas, pulveris radicis ſcillæ grana ſex, opii purificati grana tria, ſyrupi *melaſſes* dicti quantum ſatis ſit. Contunde ſimul et divide in pilulas quadraginta octo. Sumantur quatuor bis die. Interdum adjiciuntur aloes grana tria.

IN ASTHMATE A DIATHESI HYDROPICA PROVENIENTE.

HAUSTUS DIURETICUS.

℞. Aquæ puræ unciam unam et dimidiam, pulveris ſcillæ aridæ grana duo, tincturæ lavendulæ compoſitæ guttas triginta, kali præparati grana decem. Miſce. Sumatur bis vel ter die.—Interdum adji-

* Hoc medicamentum ſpeciatim his hæmorrhagiis accommodatum quæ ex aliquo viſcere læſo vi externâ exoriantur, quales in nave ſæpius quam alicubi accidere ſolent, ex præcipitiis & ex corpore colliſo a molimine machinarum & tormentorum.—Prodeſt quoque in his caſibus pulvis ipecacoanhæ compoſitus.

cere

cere licet hauſtui veſpertino tincturæ opii guttas viginti.

Vel,

BOLUS EX HYDRARGYRO CUM SCILLA.

℞. Pilularum ex hydrargyro grana quinque vel uſque ad decem, pulveris radicis ſcillæ grana duo. Miſce. Sumatur horâ decubitûs per tres vel quatuor noctes conſequentes.

Vel,

℞. Aquæ puræ ferventis libram unam, foliorum ſiccorum digitalis purpureæ drachmam unam. Coque per ſextam partem horæ et cola. Sumatur uncia dimidia ter indie. Vel ſumantur pulveris ejuſdem grana duo ter indie.

IN RHEUMATISMO ACUTO.

MISTURA DIAPHORETICA.

℞. Aquæ puræ uncias tres, aquæ ammoniæ acetatæ unciam unam et dimidiam, pulveris antimonialis grana quindecim. Sumatur tertia pars ter die.—Interdum adjiciantur nitri grana decem ſingulis doſibus.

Bibatur affatim decoctum hordei tepidum, cum nitri drachmâ unâ in ſingulis libris.

HAUSTUS SUDORIFICUS.

℞. Miſturæ camphoratæ unciam unam et dimidiam, aquæ ammoniæ acetatæ unciam dimidiam, vini emetici guttas quadraginta, tincturæ opii guttas viginti. Miſce. Sumatur horâ ſomni, vel etiam ſæpius ſed cum dimidiâ tincturâ.

IN RHEUMATISMO CHRONICO.

℞. Tincturæ guaiaci volatilis drachmas duas. Sumatur ex cyatho potûs communis ter die. Vel ſumatur gummi guaici ſemidrachma ſuper bibendo hauſtum ex ſalis cornu cervi ſcrupulo, et aquæ unciis tribus.

℞. Pulveris ipecacoanhæ compoſiti (Pharm. Lond.) ſcrupulum unum. Sumatur hora ſomni alternis noctibus.

Morbo vehementer et diu fævente pro remedio efficaci compertum eſt dare quotidie calomelanos granum unum vel grana duo, per viginti vel triginta dies.

IN HYDROPE.

PULVIS HYDRAGOGUS.

℞. Cryſtallorum tartari drachmas tres, pulveris jalapii grana quindecim, pulveris zinziberis grana quinque. Miſce, fiat pulvis, ſumatur alternis diebus. Interdum commode adjiciuntur gambogiæ grana tria, vel pulveris iridis Florentini ſcrupulus unus.

MISTURA DIURETICA.

℞. Infuſi gentianæ vel quaſſiæ vel abſynthii uncias decem, ſpiritus vini tenuis uncias duas, kali præparati drachmam unam. Miſce. Hauriantur unciæ tres bis die.

TINCTURA SCILLÆ. Pharm. Lond.

Sumatur drachma dimidia ter quaterve die ex hauſtu potus communis.

PULVIS EX ELATERIO.

℞. Elaterii grana tria, ſacchari drachmam dimidiam. Miſce et divide in chartulas ſex. Sumatur una et repetatur ad intervallum ſemihoræ donec vomitus et catharſis cieantur.

* Ægro licet, imo prodeſt hoc morbo laboranti bibere ad libitum liquorem aliquem ſiti extinguendæ accommodatum, veluti decoctum hordei cum cryſtallis tartari.

IN ERYSIPELATE.

† ℞. Pulveris cinchonæ drachmam unam. Sumatur omni horâ vel interpoſitis duabus vel tribus horis.

* Hujus doctrinæ auctor eſt Hippocrates, quæ reſtaurata eſt auctaque a Cl. Milman in opuſculo ſuo de hydrope:

† Hæc methodus medendi, quæ æque efficax ac ſimplex eſt, primo excogitata fuit a Cl. Georgio Fordyce medico noſocomii Sti. Thomæ, ubi & ipſe feliciſſimo cum ſucceſſu eandem expertus ſum, in muneribus meis ibi fungendis.

IN

IN MORBO VENEREO.

1. IN GONORRHOEA.

Hauriatur ad libitum infusum lini, vel decoctum hordei cum gummi arabici unciâ dimidiâ in singulis libris.

Sumatur calomelanos granum unum quotidie per viginti circiter dies.

* ℞. Aquæ puræ distillatæ uncias octo, hydrargyri muriati granum unum. Misce. Injiciatur pauxillum in urethram bis vel ter die. Interdum conferat adjicere opii grana duo, vel adhibere cerussæ acetatæ grana duodecim loco hydrargyri muriati.

IN GONORRHOEA BENIGNA.

℞. Balsami capaivæ, tincturæ lavendulæ compositæ, singulorum guttas triginti. Misce. Sumatur bis vel ter die.

Vel,

℞. Aluminis usti, pulveris rhabarbari, singulorum partes æquales; terebinthinæ vel balsami canadensis quantum satis sit. Divide in pilulas pendentes grana tria singulæ. Sumantur tres bis vel ter die.

Commode adhibetur interdum injectio ex aquæ puræ unciis octo, zinci vitriolati vel aluminis granis octo ad sedecim.

2. IN ULCUSCULIS.

In initio feliciter adhibetur causticum.

℞. Calomelanos drachmam unam, conservæ cujusvis vel micæ panis quantum satis sit. Contunde in massam et divide in pilulas triginta. Sumatur una bis indies ut cieatur ptyalismus modicus. Perstet æger in usu medicamenti hujus per dies octo postquam sanata fuerint ulcuscula.

* Vide opus Cl. Johannis Hunter de morbo venereo. Periti tamen sunt quidam, qui opinantur injectiones qualescunque hic nil valere. Gonorrhœa certe medetur persæpe sine medicamentis vel interne vel externe adhibitis, solâ scilicet quiete, et abstinendo a victu acri, vel nimis lauto, et a liquoribus vinosis.

Pro

Pro medicamento topico, utile erit inſpergere ulcuſculum cum pulvere hydrargyri nitrati.

3. IN BUBONE.

Illinatur artus lateris affecti infra inguen cum unguenti ex hydrargyro drachmâ dimidiâ quotidie.

Si abierit bubo in ulcus mali moris omittatur pro tempore uſus hydrargyri, et ſumatur quotidie * opii purificati granum unum primo ſemel, dein bis, denique ter die vel etiam ſæpius, et pulveris cinchonæ drachma una ter quaterve die.

4. IN VERA LUE, anginâ ſcilicet, oſteocopiis, exoſtoſibus, et defædatione cutis.

Illinantur membra quotidie cum unguenti ex hydrargyro fortioris drachmis duabus quotidie uſque dum cieatur † ptyaliſmus per dies triginta quinque, vel donec evanuerint ſymptomata.—Interdum vice litûs adhibere conveniat vel calomelanos granum unum ter die, vel pilularum ex hydrargyro grana quinque bis die, vel

℞. Hydrargyri muriati grana octo, ſpiritus vinoſi tenuis libram unam. Fiat ſolutio, et ſumatur uncia dimidia bis die. In ulceribus tonſillarum pernotabili eſt auxilio ſuffitum ex cinnabare in fauces inhalare ſemel vel bis quotidie. Methodus autem per litum efficaciſſima eſt.

Si ulcera mali moris exorta fuerint in quavis corporis parte, eadem, ut jam de bubone dictum eſt, fiant ‡.

IN

* Vires opii in iſto morbo primo innotuerunt ex experientiâ Cl. Nooth, dum præfuit noſocomiis militaribus in America, & pro optimo remedio a peritiſſimis medicis & chirurgis jam habetur.

† Non hic intelligitur ptyaliſmum veram eſſe cauſam quâ efficitur medela morbi, ſed præcipitur ut pro argumento ſit hydrargyrum in vaſa minima permeaſſe adeo ut effectum edat in ſubigendo morbo. Vide Opus Hunteri,

‡ Acidum nitricum nuper famâ pro remedio contra ſyphilidem nobis innotuit. Multum autem de facultate iſta diſcrepant ſententiæ medicorum. Chirurgis navalibus pericula plura de hac re facta ſunt, et ſuffragia prope equalia ex utriſque partibus lata ſunt. Satis plane conſtat viribus

℞. Aquæ puræ libram unam, argenti nitrati (vulgo dictum cauſticum lunare) drachmam unam. Sit pro lotione.

Vel,

Madefiat ulcus cum tinctură myrrhæ.

Vel,

℞. Aquæ puræ libram unam, acidi nitrici drachmas duas. Sit pro lotione, et minuatur acidum quando ulcus fiat magis ſenſibilis.

Vel,

℞. Unguenti hydrargyri nitrati (vulgo unguentum citrinum) partem unam, adipis ſuillæ partes tres. Miſce. Augetur unguentum hydrargyri pro ratione ſenſibilitatis et irritabilitatis ulceris.

Vel,

℞. Unguenti reſinæ flavæ unciam unam, hydrargyri nitrati rubri drachmam unam. Miſce.

Partibus liquore fervente leſis, adhibendum acetum frigidum. Pars leſa vel immergi debet in aceto, vel linteamina eadem madida ei imponenda.

Partibus igne leſis, adhibendum oleum lini cum pari portione aquæ calcis.

℞. Aquæ libram unam, aquæ lithargyri acetati drachmam dimidiam, vel ceruſſæ acetatæ grana quatuor, ſpiritus vini drachmas ſex.

Vel,

℞. Ceruſſæ acetatæ ſcrupulos duos, ſpiritus vini drachmas ſex, aquæ libram unam.

Glacies, vel aqua quâ liqueſcit glacies, partibus aduſtis diu admota, ſummum beneficium adfert, tum leniendo dolore tum ſanatione expediendâ

viribus quibuſdam iſtius morbi ſubigendi gaudere hoc medicamentum. Sæpe autem ſpem fallere, et aliquoties medelam parum ſtabilem efficere æque conſtat. Re igitur rite perpenſâ, me judice, apud conſultos viros in poſterum pro adjumento aliorum medicaminum haberi poteſt, nequaquam autem pro ſolo remedio adhiberi debet. Datur a drachmâ unâ ad drachmas tres quotidie ex aquæ quanto ſatis ſit ad obtundendam acrimoniam.

IN SCORBUTO MARINO.

Sumat æger quotidie acidi citrici unciam unam ter quaterve die.

℞. Aquæ puræ paullulum tepefactæ congios triginta, ſyrupi *melaſſes* dicti libras ſedecim pondere, extracti pini uncias octo ponderc, ſpumæ vel fæcis cereviſiæ libras duas menſurâ. Miſce et agita valide cum baculo, deinde abeat in fermentationem, ut fiat cereviſia, quæ in vaſe clauſo ſervari debet. Ut diutius ſervetur, proderit admiſcere ſpiritus vini tenuis Gallici, vel qui *rum* dicitur, libras duas aut tres. Si infirma fuerint viſcera adjicere juvabit vel lupuli vel ſummitatum abſinthii vel quaſſiæ, vel zinziberis quantum ſatis ſit. Hauriat æger libras duas quotidie.

℞. Farinæ avenaceæ libras tres, aquæ puræ congios quatuor. Miſce. Macera donec liquor fiat acidulus, dein effunde dimidium et adjiciatur par copia aquæ puræ, et coque ad idoneam ſpiſſitudinem, ut cogatur in pulmentum. Sit pro victu aſſiduo cum vini et ſacchari non purificati, vel ſyrupi *melaſſes* dicti, quantum ſufficiat ad gratum ſaporem conciliandum.

His remediis deficientibus, adhibeatur quod ſequitur.

℞. Aceti libras duas, nitri uncias duas. Miſce. Sumantur uncia una vel duæ ter quaterve die.

Ad alvum ſolvendam commode adhiberi poteſt electuarium eccoproticum e cryſtallis tartari et pulvere jalapii, cum ſyrupi vel tamarindi quanto ſatis ſit.

TO

RUFUS KING, Esq.

MINISTER PLENIPOTENTIARY FROM THE STATES OF AMERICA TO THE COURT OF LONDON.

London, 26th November 1798.

SIR,

I SIT down to perform the promise I made you this morning, of putting on paper some remarks on the nature of the yellow fever, and the means of preventing it.

In doing this I shall chiefly confine myself to those views of it in which the magistrate is concerned. The adopting of measures for the prevention of disease is one of the most important duties of a wise and patriotic government; and the discovery of these means, as well as the efficiency of the steps to be taken, must depend on a thorough knowledge of the causes by which it is excited and influenced. My opportunities upon actual service in the West Indies in the late war, when physician to the fleet under the command of Lord Rodney and Admiral Pigot, and my present official duty as a member of the Medical Board of the Navy, have necessarily brought to my knowledge a number of facts relating to this subject, and I shall be extremely happy if the communication of some of the most important of them can throw

any

any light, which may prove uſeful to the American government in checking an evil ſo afflicting and calamitous.

The firſt queſtion that occurs with a view to preventive meaſures is, whether this diſeaſe be infectious, and under what circumſtances it is ſo.

In thoſe ſituations in which I obſerved it in the Weſt Indies, it was evidently ſo. There was the moſt inconteſtable evidence of this, both on board of ſhips, and at hoſpitals, and the doubts which have been ſtarted on this point, ſeem to have ariſen from the operation of infection being blended with that of other cauſes, which muſt concur with it in order to give it effect.

But whatever doubts there may be on this ſubject in the Weſt Indies, there can be none in the climate of North America. This will be beſt proved and illuſtrated by an example.

On the 16th of May 1795, the Thetis and Huſſar frigates captured two French armed ſhips from Guadaloupe on the coaſt of America. One of theſe had the yellow fever on board, and out of fourteen men ſent from the Huſſar to take care of her, nine died of this fever before ſhe reached Halifax on the 28th of the ſame month, and the five others were ſent to the hoſpital ſick of the ſame diſtemper. Part of the priſoners were removed on board of the Huſſar, and though care was taken to ſelect thoſe ſeemingly in perfect health, the diſeaſe ſpread rapidly in that ſhip, ſo that near one-third of the whole crew was more or leſs affected by it.

This

This fact carries a conviction of the reality of infection, as irreſiſtable as volumes of argument, and it farther affords matter of important and inſtructive information, by proving that the infection may be conveyed by the perſons or clothes of men in health.

It is a queſtion of ſtill more conſequence with a view to preventive meaſures, whether this epidemic has ariſen in the towns of North America from internal cauſes, or whether it was imported from the Weſt Indies.

In order to decide upon this, it will be néceſſary to go back into the origin of this diſeaſe, in ſo far as it can be aſcertained.

After laying together and conſidering fully all the facts relating to this ſubject, it appears to me that the yellow fever cannot be produced, but in a ſeaſon or climate in which the heat of the atmoſphere is pretty uniformly, for a length of time, above the 80th degree of Fahrenheit's thermometer; that under the influence of this heat, Europeans newly arrived, and more eſpecially in circumſtances of intemperance, or fatigue in the ſun, may be ſubject to it in many inſtances, but that it has uſually become general only by the previous influence of that infection which produces the jail, hoſpital, or ſhip fever, or from the influence of putrid exhalations; and that when ſo produced, it continues itſelf by infection. It would be too tedious to enumerate the multiplied proofs of this, which have occurred to me in my connection with the public ſervice. With regard to the effect of ſhip infection, it is enough to ſay that the ſeamen of ſhips of war from England having infectious fevers on board, were obſerved to be moſt ſubject to the yellow fever when they arrived in the Weſt Indies, and that the troops which

have

have been conveyed in ill-aired, crowded, and ſickly tranſports, are the moſt liable to it after diſembarking: this applies even to that part of them who have arrived in health. And with regard to the effect of putrid exhalations, I need only mention, that at the time of the battle of the 12th of April 1782, there was not a ſickly ſhip in our fleet, but many of thoſe officers and men who were ſent to take care of the French prizes, were ſeized with the yellow fever; and it was obſerved, that when at any time the holds of theſe ſhips, which were full of putrid matter, were ſtirred, there was an evident increaſe of theſe fevers ſoon after.

It has been alleged by ſome authors, that the yellow fever is produced by the ſame marſhy exhalations which produce the intermittent and remittent fevers, and that it is only a variety of the latter; but the remitting fevers differ from it in ſome eſſential ſymptoms, and the yellow fever has been known to ariſe, both in ſhips and on ſhore, where men were entirely out of the reach of the vapours of marſhes.

It may naturally be expected that this infection, in common with all others, will not take effect except in particular circumſtances. There have been phyſicians paradoxical enough to maintain, that the plague itſelf is not infectious, and their principal argument is, that numbers are expoſed to it, without being affected by it. But the ſame may be ſaid of the ſmall-pox, and it is the nature of all infection to require a certain concurrence of circumſtances, both external and in the conſtitution of thoſe expoſed to it, in order to its taking effect. One circumſtance neceſſary to the operation of the infection of the plague is, a certain range of atmoſpheric heat. A temperature above 80° or below 60° will ſoon put a ſtop to this epidemic,

ſo that it was never known between the tropics, nor within the polar circles; and it is only at certain ſeaſons that it appears in the temperate zone.

The atmoſpheric heat neceſſary for the excitement of the yellow fever, begins where that of the plague leaves off, for it has never been known to ariſe and prevail but when the thermometer ſtood for ſome length of time pretty uniformly above 80°, as has been already ſtated.

But not only a certain degree of heat is neceſſary to bring the infection of the plague into action, but a concurrence of other circumſtances, conſiſting in want of cleanlineſs and ventilation, and a certain obſcure ſtate of the atmoſphere. London, in the laſt century, was never entirely free from the plague till 1666, and it had in that period been four times epidemic. The laſt time it was ſo was in 1665. In 1666 the great fire happened, which gave occaſion to rebuilding the city on a more ſpacious and airy plan; and the greater degree of perſonal cleanlineſs which began to prevail about that time, together with the conſtruction of common ſewers, have, no doubt, been the cauſes that have counteracted the introduction of it for the laſt hundred and thirty-two years.

It is farther in proof of the neceſſity of a certain given concurrence of circumſtances, that particular claſſes of ſociety are in a great meaſure exempt from it. Lord Clarendon, in the hiſtory of his own life, relates, that when he and other people of condition who had fled from the plague returned to London, they hardly miſſed one of their friends or acquaintances, the mortality having been confined almoſt entirely to the loweſt orders of the people.

Though it is true, therefore, that in thoſe years in which the plague has prevailed in London, it has become nearly extinct in the month of November, juſt after the infection had been accumulated to the utmoſt; and though it is equally true, that the ſmall-pox or meaſles will frequently occur and become epidemic, though no infection can be traced; yet neither the one nor the other of theſe facts can be urged as proofs that theſe diſeaſes are not infectious.

In applying theſe obſervations to the queſtion concerning the importation of the infection into Philadelphia and the other towns of America, I cannot but think that they make greatly for the affirmative; for it is agreeable to the analogy of all other infection, that it may be introduced ſo as to prove active in portions ſo minute as to eſcape detection, and at other times may fail of producing its effect, though in the moſt accumulated ſtate.

The circumſtances under which it appears in North America are, indeed, totally different from thoſe in which it appears in the Weſt Indies. This fever had not prevailed in Philadelphia from 1762 till 1793; whereas it occurs, more or leſs, every year in the Weſt Indies, and its prevalence is in proportion to the number of new comers from Europe. If this diſeaſe were the ſpontaneous production of America, how comes it that it did not deſtroy the Britiſh armies which acted in the late war in Pennſylvania, Virginia, and Carolina, as it has done of late in the Weſt Indies? It is alſo againſt the laws of probability, that this fever ſhould have ariſen by mere accident in that year in which a number of French emigrants had arrived from the iſlands in which it prevailed, and in a year in which it had prevailed there to ſuch an unexampled degree.

Suppoſing it eſtabliſhed, therefore, as a truth, that this diſeaſe aroſe from imported infection, we are next to enquire, what are the precautionary meaſures that ought to be adopted to prevent its introduction, or counteract its influence.

Theſe divide themſelves into three heads: firſt, the prevention of the importation; ſecondly, the prevention of its ſpreading; thirdly, the removal of thoſe circumſtances which prediſpoſe to its action.

Under the firſt head is included the regulations relating to quarantines. To enter into the detail of this ſubject, would encroach too much upon your time and mine; and it would be unneceſſary, conſidering the great fulneſs and accuracy with which this has been done by Dr. Ruſſell, in his work on the plague.

The ſecond head is extremely important, and the neglect of it has at all times given occaſion to the extenſive ſpread of peſtilential diſorders. The principle of it is compriſed in theſe few words, "to diſcover the firſt "beginnings of diſeaſe, and to cut off all intercourſe with "the infected." It is at this period only that ſuch a meaſure can be effectual, the number of infected being ſmall. I muſt refer to the ſame work for the detail of the regulations regarding this.

The third head is one which has not been commonly enumerated and treated of by thoſe who have written on this ſubject. It is only, however, neceſſary to reflect on the preſent ſituation of London, to become ſenſible of its great importance. It is extremely doubtful how far this city owes its ſafety to quarantines; and there is no proof of the peſtilence having ever been ſtopped in England by the vigilant detection of its firſt invaſion, and the

conſequent adoption of wiſe and vigorous meaſures to prevent intercourſe. But the advantages of ſpacious and airy habitations, of perſonal cleanlineſs, of dryneſs and cleanlineſs from forming drains and common ſewers, are undeniable. The commerce in this age to all parts of the world ſo far exceeds whatever was known in former ages, that there is, moſt probably, at all times enough of infection in the warehouſes of London to kindle the flames of peſtilence, if the fuel were duly prepared and diſpoſed for its action.

I am not ſufficiently acquainted with the towns of America to ſay what improvements they admit of in the points above mentioned: it is evident, however, that the cauſes of this fever are connected with thoſe circumſtances which belong to a town; for, if I am rightly informed, it has not ſpread into villages and ſingle houſes in the country. As the inhabitants of America poſſeſs habits of cleanlineſs in their perſons and habitations in common with the reſt of the civilized world in our times, the amendment required is not in theſe points. A circumſtance which you mentioned to me regarding New York, to wit, that the fever prevailed only in that quarter of the town which adjoins the eaſt river, and had not ſpread to that which borders on the north river, ſeems to point out the meaſures that are likely to be moſt adviſeable and practicable for meliorating the air of the towns in the American ſtates. Drains and common ſewers*, therefore, of the moſt perfect conſtruction that can be deviſed for promoting dryneſs and ſweetneſs, by carrying off all ſuperfluous moiſture, and for conveying all manner of

* Even in the moſt remote antiquity common ſewers were conſidered as eſſential to the health and comfort of great cities. Thoſe of Rome are ſo ancient, that there is no hiſtorical record of the time of their conſtruction, but we know they exiſted in the times of the kings. They were formed upon ſo great a ſcale, and with ſo much labour, that they were accounted one of the wonders of the world.

filth

filth and ſoil under ground, could not fail to be highly conducive to general health, and to prevent the future viſitations of epidemic fevers. Whether the late fever has been owing to imported infection, or to the bad air of the place, this precaution is equally founded upoo reaſon. I conſider the drains and ſewers of London as the moſt eſſential circumſtance in promoting that decency, comfort, and health, enjoyed ſo long by this great metropolis, in a degree of which I believe there is no example in ancient or modern times.

I am, with much reſpect,
Sir,
Your moſt obedient humble ſervant,
GIL. BLANE.

P. S. Upon reviſing the preceding letter, it has occurred to me, that in enumerating the different heads of preventive means, I ought to have mentioned what is called *expurgation*, that is, the methods taken for the expulſion and deſtruction of infection when the diſeaſe is declining, or has ceaſed. Dr. Ruſſell is very full on this ſubject; but ſince he wrote, there is a method of fumigation introduced by Dr. Carmichael Smyth, of which he has publiſhed an account; and as this has acquired ſome name from trials made in the hoſpitals for priſoners of war and in the navy, I ſhould think it would be worth a trial in America, as one of the means for the expurgation of the infection of the yellow fever.

TO

Sir JOHN HIPPISLEY, Bart.

MEMBER OF THE QUARANTINE COMMITTEE OF THE TURKEY COMPANY.

London, 26th December, 1798.

Sir,

IN compliance with your wiſh, I ſend incloſed a copy of my letter to the American Miniſter on the nature of infection, and the means of counteracting it; and beg you will do me the honour of preſenting it to the Turkey Company.

In our converſation on this ſubject ſome time ago, I mentioned to you ſome information I had from the Turkiſh Ambaſſador, which probably led you to think that what I lately wrote was addreſſed to him: but though it relates chiefly to the yellow fever, the obſervations apply to infection in general; and as my illuſtrations and arguments are moſtly drawn from the plague, the practical remarks are nearly the ſame as if this epidemic had been expreſsly treated of.

I have, however, ſince I ſaw you, turned my thoughts ſtill farther to this ſubject; and I cannot but feel the confidence you are pleaſed to repoſe on me, as impoſing a moſt ſerious reſponſibility in what ſo deeply concerns the national ſafety and commercial intereſts of this country. This conſideration will, I hope, prevent me from advancing

vancing any thing lightly in what I have farther to ſay on a ſubject ſo momentous.

I apprehend it ought to be a leading maxim in regulating the meaſures to be taken for the excluſion and deſtruction of infection, that the means ſhould in all points be, as nearly as poſſible, commenſurate to the end. It is as dangerous to go beyond the object as to fall ſhort of it. Unneceſſary rigour not only creates perſonal hardſhip, commercial loſs and diſtreſs, but defeats its own purpoſe, by looſening the ſanctions and motives which ought to enſure the ſtrict obſervance of rules. The temptations ariſing from ſelf intereſt to contravene whatever militates againſt itſelf, are in all caſes very ſtrong, but muſt be doubly ſo where there is a conviction of the unneceſſary ſeverity of the reſtraining laws.

The rigour of quarantines ſhould therefore be different according to the degree of riſque. The varieties of theſe riſques depending on the greater or leſs chance of importing infection, have been ſufficiently attended to by others. What I mean now to inſiſt upon is, the greater or leſs chance of its taking effect when actually imported.

I have noticed, in the incloſed letter, the different degrees of ſuſceptibility to epidemic diſeaſes ariſing from the improvement of manners and the progreſs of civilization. Thoſe only whoſe duty leads them to conſider the ſubject, are aware how much the welfare of the human ſpecies depends on ventilation and cleanlineſs; and no one could render a greater ſervice to his fellow-creatures, than to impreſs on their minds the neceſſity of cultivating them as moral and religious duties, or, at leaſt, to inform the more enlightened part of mankind of the truth and great

importance of theſe facts. There is ſufficient proof of them, both from ancient and modern hiſtory.

Though Egypt in modern times is conſidered as the conſtant abode and fountain, as it were, of peſtilence, yet Herodotus [Euterp. 37.] obſerves, that its inhabitants, and thoſe of Lybia, are the moſt healthy in the world, and remarks that they were eminently cleanly. It is obſervable, that that part of Hindoſtan which lies in the temperate zone, and therefore under that range of atmoſpheric heat which is favourable to the plague, has never yet been afflicted with it, in ſo far as we can learn from hiſtory, though a commercial intercourſe is kept up with the Turkiſh dominions. This can only be aſcribed to the great cleanlineſs preſcribed by their religion.

The modes of life in England have undergone a complete revolution in this reſpect within the laſt two hundred years; and it is to this I have chiefly aſcribed our long exemption from the plague. Holland affords a ſtill ſtronger proof of this. The Dutch, in the period alluded to, have been not only the moſt commercial and the moſt cleanly people of Europe, but perhaps the moſt ſlovenly and careleſs with regard to the excluſion of peſtilential infection; and yet they have not in that time been viſited by the plague.

And it is farther worthy of remark, that they not only expoſe themſelves to it, but their neighbours; for their cargoes brought from the Levant, conſiſting of certain raw materials very liable to harbour infection, are conveyed immediately to England, after undergoing, as I am credibly informed, certain precautionary proceſſes, which are little better than empty forms.

There

There is another circumſtance relating to ſuſceptibility, which though it has not as yet, ſo far as I know, been conſidered as affecting the regulations of trade and quarantine, will, I apprehend, be found well worth attending to. It is invariably remarked in all countries liable to the plague, that there are certain ſeaſons of the year in which the people are incapable of being epidemically affected by it. It has never *ſpread* in this country but in the months of July, Auguſt, September, and October, and has then ſpontaneouſly ceaſed as an epidemic. Now is it conceivable, that the trifling quantity of infection which may adhere to a bale of goods imported in the month of November, for example, can have any effect in exciting the plague, when the infection accumulated from thouſands of ſick perſons, becomes at that time innocuous? Might not commerce, therefore, avail itſelf of this diſtinction of ſeaſons, by making the importations from infected or ſuſpected ports in the winter ſix months, thereby avoiding the riſque of propagating diſeaſe, and diminiſhing the neceſſity of rigorous precautionary meaſures? During this ſeaſon the principal object would be to diſſipate any poſſible infection by airings, or to deſtroy it by fumigation, in order that it may not lurk till the return of the ſuſceptible ſeaſon.

The only other queſtion of importance which I ſhall now touch upon is, whether lazarettoes ought to be afloat or on ſhore. The advantages of their being afloat are, 1ſt. That they are more airy than thoſe on ſhore, of the moſt approved conſtruction, which are ſurrounded by high double walls. The flux and reflux of the tide alſo produces ſome degree of ſalutary agitation of the air, and both their ports and upper works are conſtructed with lattice work for the free perflation of air. 2dly. That

That they are more eaſily guarded. 3dly. That they are leſs expenſive. 4thly. That they are moveable; and 5thly. That they admit better of being multiplied.

The only objection I have heard to them is, that they are not ſufficiently large. But thoſe who make this objection, can hardly be aware of the extenſive accommodations practicable in a large ſhip of war.

The expence attending the erection of the numerous lazarettoes that would be neceſſary, is, I apprehend, a ſolid objection againſt them; and it might hereafter be found, that they were not placed on the moſt commodious ſpots, whereas hulks are moveable. The Levant is not the only part of the world from whence the infection to be guarded againſt is imported; for about twenty-five years ago, a ſyſtem of reſtrictive regulations was adopted with regard to ſhips from the ports of the Baltic, while the plague was in Ruſſia and Poland.

It occurs to me that St. Mary's, Scilly, or Falmouth, would be the beſt places for the quarantine of the trade from the Levant; and Hull, Yarmouth, and the Iſle of Grain, at the mouth of the Medway, for the trade from the Baltic. This laſt ſituation would probably be found more commodious than Standgate Creek, from its being an iſland, and more convenient for the port of London, from its adjoining to the Thames. The whole of the country on that part of the Medway is very damp, but this is rather a recommendation than an objection; for though damp air is unwholeſome, this is partly owing to its greater * attraction for noxious effluvia, whereby it carries it off ſooner than dry air would. It is remarked

* See page 261 of the preceding Work.

in

in Turkey, that one night's ventilation of goods in a foggy or damp air, is more effectual than a month of dry weather.

The only advantage that occurs to me of lazarettoes on ſhore over thoſe afloat, is, that they afford a more agreeable retreat to paſſengers and others during their confinement. This is well worth attention, not only from conſiderations of humanity, but becauſe every addition to perſonal hardſhip is an additional temptation to infringe the eſtabliſhed rules. This advantage might eaſily be combined with the floating lazarettoes, by erecting ſome apartments on a ſmall ſcale on the adjacent beach for the clothing and purification of ſuch perſons, and for their reſidence during the preſcribed time.

But if theſe floating lazarettoes ſhould not be conſidered as ultimately preferable, they certainly are unexceptionable as temporary ſuccedaneums, more eſpecially at this moment, when, from the political relations of the foreign powers, a great increaſe of the Turkey trade is rendered probable, and when every obſtacle to it ſhould be removed, in ſo far as is conſiſtent with the public ſafety. And in caſe they ſhould be found adequate to the purpoſe, I apprehend no intermediate quarantine would be neceſſary in the Mediterranean, ſuch as is preſcribed to be performed at Malta, Leghorn, or ſome other port in the Mediterranean or Adriatic; for this was intended by the legiſlature merely as a temporary regulation till lazarettoes ſhould be built.

Theſe are the remarks which have occurred to me ſince I ſaw you, and if you think them deſerving of being communicated to the Turkey company, you are welcome to

to do ſo. For farther information I beg to refer you to the work of Dr. Ruſſell, who has deſerved highly of the world, for the intrepidity, ingenuity, and induſtry he has diſplayed in his labours on this branch of his profeſſion.

I am, with much reſpect,

Sir,

Your moſt obedient humble Servant.

GIL. BLANE.

QUERIES,

Submitted to Doctor JOHNSTON and Doctor BLANE, by the Turkey Company; with their Anſwers.

1ſt. ARE the veſſels well adapted for airing cargoes, and can any improvements be made in their conſtruction?

They are well adapted, but many improvements may be made both for ſhortening quarantine, and for more effectually purifying merchandize with foul bills.

2d. From the affidavits and teſtimonials with which we have furniſhed you, with regard to the manner of performing quarantine in Holland, do you conceive that it would be effectual in deſtroying infection if any adhered to goods imported?

We are of opinion that they would not be effectual.

3d. In caſe you think theſe nugatory or inſufficient, can you account for the exemption of Holland and England from the plague for the laſt one hundred and thirty-three years, both theſe countries having been expoſed to the unpurified cotton imported by the Dutch, who have no lazarettoes of any kind, and make little if any diſtinction between clean and foul bills?

We

We are inclined to aſcribe the happy exemption of theſe countries from the peſtilence, ſince the year 1665, to a want of ſuſceptibility, ariſing from various improvements in the habits and arts of life. The great fire of London happened the year after the laſt plague, and the more ſpacious and airy manner in which the city was rebuilt, has no doubt contributed to its general ſalubrity, as well as the conſtruction of common ſewers about that time, or ſoon after, and the general reformation which took place in that age in the taſtes and habits of the people, in conſequence of the advancement of civilization and commerce, conſiſting chiefly in perſonal cleanlineſs and comfort, from the general uſe of ſoap and linen, the more ample ſupply of fuel, in conſequence of the importation of coals by ſea, and the more free uſe of vegetable food. It is a general remark in the hiſtory of all plagues, both in Aſia and Europe, that they break out and prevail only among the loweſt and pooreſt ranks of people, never becoming properly epidemic among the better ſort. The general maſs of the people are at preſent in poſſeſſion of nearly the ſame comforts, and means of cleanlineſs, as the gentry two hundred years ago. The ſame reaſoning will, we apprehend, apply to Holland.

4th. From your experience and ſucceſs in deſtroying infection in the royal navy, do you know of any better method of deſtroying infection than by airing the articles ſuſpected of containing it?

The method which we truſt to in deſtroying the infection of malignant fevers, not only ſuſpected, but certainly exiſting in the clothes of ſeamen, is by a fumigation with brimſtone. It might have been added, "The putting of the infected clothes into a heated oven."

5th. The

5th. The law requiring that Levant goods, liable to retain infection, ſhall be ſufficiently opened and aired in the lazarettoes of Malta, Leghorn, Ancona, Venice, Meſſina, or Marſeilles (none of which are now acceſſible) are you of opinion that the ſame precautions as practiſed at Leghorn (the authenticated particulars of which are encloſed) which is the uſual place where Britiſh ſhips perform their quarantine with foul bills, can be adopted with great ſafety to the public in the lazarettoes at Standgate Creek, and do you think the floating lazarettoes have any advantage over thoſe on ſhore?

There can be no doubt, that if the ſame means are uſed reſpecting the purification of goods in England that are practiced at the places ſpecified in this quere, it might be done with equal ſafety to the public; and we are of opinion that floating lazerettoes, with the improvements that may be made in their conſtruction and regulation, with ſome addition to their eſtabliſhment, are preferable to any that can be built on ſhore.

IMPROVEMENTS propoſed by Dr. JOHNSTON and Dr. BLANE, in the Conſtruction and Regulations of the Lazarettoes in Standgate Creek.

THE principal improvements which occur to us, in the conſtruction, would be,

I. Either to ſlit and perforate the decks, ſo as to reſemble the gratings forming the floors of the houſe, or to take up theſe decks, and conſtruct gratings in the room of them.

II. To cut ports in the ſide between the orlop and lower gun deck. Their length ſhould be fore and aft, and cloſe to the lower gun deck.

III. The perflation and change of air would be rendered ſtill more complete, if an opening were made in the roof, ſurmounted with a moveable ſkreen, or vane, called a cowl; or with a turret, fitted with louvre boards, as a ſecurity againſt the weather.

With regard to regulations, in ſo far as theſe reſpect the detail of airing goods, we would recommend an imitation of thoſe practiſed in the foreign lazarettoes, which have been found, by long experience, adequate to the purpoſe. Theſe may be ſeen deſcribed by Mr. Howard, who performed quarantine himſelf at Venice, where the firſt lazaretto in Europe was eſtabliſhed; and where the plague has never been ſince its firſt inſtitution. We are, however, of opinion, with Mr. Howard, that the time might be abridged, particularly if the methods of deſtroying infection by fumigation ſhould be adopted.

The

The regulations moſt urgently called for at preſent, on the ſuppoſition of ſhips without clean bills being admitted, are,

I. To eſtabliſh a floating infirmary. This ſhould conſiſt of a ſhip, moored near the lazarettoes, with one or more medical attendants, proper apartments, bedding, medicines, &c. arranged, on the ſuppoſition of the plague actually ariſing; the poſſibility of which ſhould never be loſt ſight of. Even on the preſent footing of the lazarettoes it ſeems neceſſary, were it only as a matter of humanity towards the ſuperintendents and labourers, who, we are told, at times experienced great hardſhip from ſevere illneſſes, during which they had been cut off from all medical aſſiſtance; and in caſe of a fracture, or other ſevere injury, the hardſhip would be ſtill greater.

II. The next material alteration called for in the regulations, would be the repeal of that part of the act of parliament of 1754, whereby the ſuperintendents are required, in caſe of the plague actually appearing, to communicate it to the privy council, and to wait for their directions. As the delay which this would occaſion would be attended with the greateſt inconvenience, cruelty, and danger, to individuals and the public, we are of opinion, that the ſuperintendent ſhould be authorized to act upon ſuch an emergency, by inſtantly taking the proper ſteps for the ſeparation and care of the ſick.

III. As guarding is of the utmoſt importance, we ſhall ſuggeſt ſome additional precautions and arrangements which will be abſolutely neceſſary, in caſe of an increaſed riſque, to the public health, and which may be practiſed in theſe floating inſtitutions with ſuperior advantage to thoſe on ſhore.

We would recommend,

I. That they ſhould be ſurrounded with chains, attached to poſts driven into the mud, or connected by means of buoys.

II. That boats ſhould row guard all night.

III. That the boats belonging to the lazarettoes ſhould, when not upon neceſſary duty, be always either on board, or faſtened by chains, with ſtrong padlocks; the keys of which ſhould be in the cuſtody of the maſter.

IV. That centinels with loaded muſquets, and with ſmall pieces of ordnance, loaded with grape or canniſter ſhot, ſhould be conſtantly ſtationed on the moſt commanding parts of the lazarettoes.

V. That no houſes ſhould be erected on the beach, nor near it.

Under theſe regulations, we apprehend that theſe lazarettoes will be leſs expoſed to clandeſtine intercourſe, whether from the anxiety of individuals to viſit their friends, or for the purpoſe of illicit trade, than the lazarettoes on ſhore.

Office for Sick and Wounded Seamen,
2d of May, 1799.

Note. A few weeks after this, a bill was brought into parliament, which paſſed into a law, entitled, "An Act to encourage the Trade into the Levant Seas, by providing a more convenient Mode of performing Quarantine, &c." whereby ſhips from Turkey with clean bills were exempted from performing quarantine in the Mediterranean, and the crown was enabled to eſtabliſh proper regulations for the public ſafety in the ports of England.

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